American Aviation

5c *The Air Industry's Pioneer Independent Magazine* **August 15, 1949**

The Air Coach Dilemma

THE TWO MAGIC words Air Coach were supposed to brush away, like a new hit tune, all of the cares of the day. By some sort of mysterious sorcery, air coach was to be the open sesame to a new day of profitable volume air travel. It was to create a great mass of new traffic—and volume traffic would pay off.

by W. W. P.

But coining new words doesn't alter the simple but less glamorous fact that an air coach ticket is nothing more nor less than a ticket on an airplane and whether or not it produces a profit or loss must be gauged by the identical economic processes by which profit and loss is determined by regular fare seats.

Air coach was simply applying good salesmanship to a price reduction on the basic product.

And by reducing the price of the product, the proponents of air coach service were trying to attract an entire new group of travelers who would choose the airplane instead of the automobile, the railroad or the bus.

Air coach has an excellent promotional purpose by getting first-riders to like air travel, but it is only beneficial if (1) it doesn't divert passengers from regular-fare airplanes and (2) if it can be produced at a profit.

The questionnaire which the Civil Aeronautics Board saw fit to hand out to air coach passengers on five airlines during a recent two-week period brought some rather startling results.

Among the five airlines there was a range from 32.2% (Capital Airlines) to 45.0% (Continental Air Lines) of passengers who said they would have traveled on regular-fare airplanes had the coach service not been available. They were going by air anyway so they were smart—they shopped for a bargain. Can't blame them. Money counts, these days.

The survey indicated that over a third of the total air coach passengers represented diversion—a diversion not only from the airline's own traffic, but a diversion from other carriers as well.

Financially the diversion was even greater. The CAB report showed coach passenger revenues of $1,49[illegible]70 for the five carriers during April and May. However, the questionnaire study indicates that the

(Further Page 8)

Goodrich's Aviation Veteran

James S. Pedler, manager of aeronautical sales of The B. F. Goodrich Co., has completed 20 years of service with the organization which is one of the aviation industry's large suppliers of tires and rubber products, as well as wheels and brakes. Widely known in the aviation industry, Pedler is a former World War I pilot and a member of the Quiet Birdmen.

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AMERICAN AVIATION DAILY OFFICIAL AIRLINE GUIDE AMERICAN AVIATION DIRECTORY

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Airline pilots also make daily use of GCA at Keflavik, Iceland; Shannon, Ireland; Prestwick, Scotland; London, Paris, Berlin; Fairbanks and Anchorage, Alaska; Shemya and Adak in the Aleutians; Tokyo, Chitose, and Okinawa, Japan; Seoul, Korea; Manila, Philippines; New York, Washington and Chicago.

Pilots choose GCA for two reasons: GCA has a perfect fail-safe record and precision reliability; GCA is an *audial* instrument... the pilot gets landing data without further saturation of his *visual* instrument panel.

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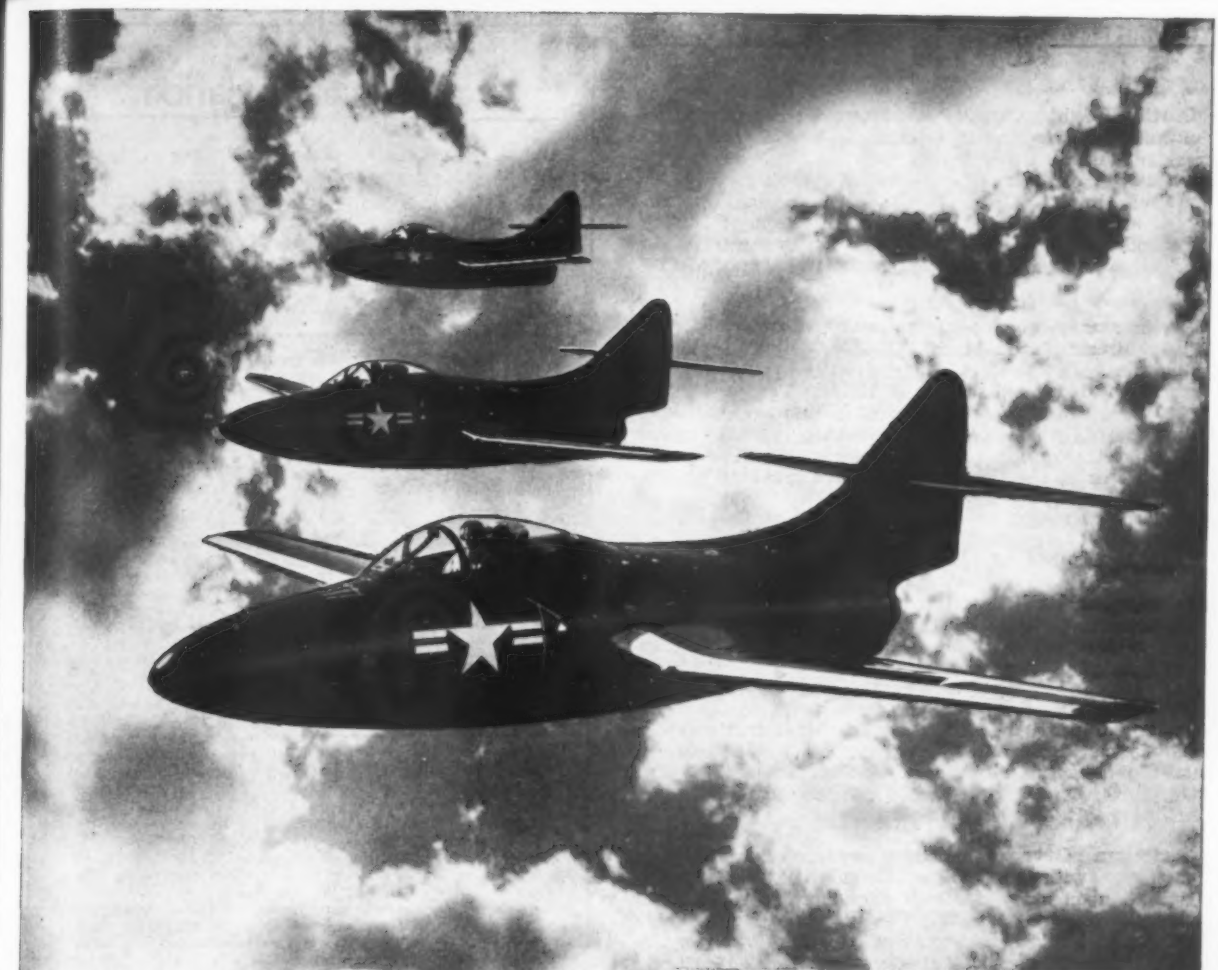
RCA INTERNATIONAL DIVISION EXPORT DISTRIBUTORS



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★ ★ ★

News in Brief

Curtiss-Wright Corp.'s management reorganization continued last week with election of Roy T. Hurley as president and director. Hurley, who assumes office about Sept. 1 was director of manufacturing engineering for the Ford Motor Co. He succeeds W. C. Jordan who resigned as C-W president last April. Election of Hurley may indicate company's intention to concentrate on production and de-emphasize speculative experimental projects.

Airlines may be forced to retain certain types of lighter aircraft, such as the DC-3, to fulfill certificate obligations. American Airlines recently requested CAB permission to suspend service at Abilene, Tex., and Jackson, Mich., since airports at these points are not suitable for safe operations with Convairs. CAB denied the request, pointing out that "nothing in American's certificate or in the Board's regulations prevents American from employing aircraft, other than Convair equipment."

Central Airlines, of Oklahoma City, has set Aug. 31 as target date for inaugurating service on the first two segments of its certificated feeder routes. Company is testing the Ryan Navion, Cessna 190 and Beech Bonanza for its operation. It plans to start with 84 employes, 24 of them pilots.

A $21,000,000 RFC loan to Northwest Airlines to finance the purchase of 10 Boeing Stratocruisers was formally certified by CAB on July 29, with Vice Chairman Oswald Ryan dissenting. RFC guarantees the full loan, with banks supplying $9,000,000 and RFC the remaining $12,000,000.

American Overseas Airlines has reached interim agreement with the Flight Communications Officers Association on basis of a new agreement to replace the one which expired July 1. The new contract effective until July 1, 1950, incorporates all provisions of the old one as well as provisions for compensation of radio officers released through introduction of radio-telephone and a quarterly time limitation.

Visa requirements have been abolished by Eire for U. S. citizens with passports.

Long airport fight between the cities of Dallas and Fort Worth has reached the Supreme Court docket through an appeal from Dallas which seeks to restrain use of Federal funds by CAA to assist Fort Worth in building of the Greater International Airport. Dallas seeks a writ of certiorari to review the refusal of the Fifth Circuit Court of Appeals in New Orleans to hear the case.

California Aeronautics Commission is eliminating eight positions from its organization as result of 40% budget reducton for current fiscal year. Budget approval was for $109,642.

Federal grants for Class IV and larger airports may be increased up to 10% by the Civil Aeronautics Administrator for projects where previous estimates of cost were too low. Before enabling legislation (S. 1280) was signed by President Truman, Congressional approval was required for such increases.

Other airport legislative actions include two bills passed by the House and sent to the White House for signature: (1) under terms of S. 1275, the U. S. share of project costs involved in installing high-intensity lighting on CAA-designated instrument landing runways would be increased from about half to 75%; (2) S. 1285 would permit partial payments to contractors as work progresses on airport construction projects.

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NEW SUPER DC-3 CUTS COSTS AND GROUND DELAYS!

Here's the fastest commercial transport to load and unload—both passengers and baggage—ever designed. It's the new Douglas *Super* DC-3!

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Super DC-3

BACKGROUND & TRENDS

Among the Airlines

As predicted, July airline traffic was down, the decline being more than normal. Some estimates put it at 10%. Hope is that August will be better . . . As a result of the recent series of non-scheduled accidents, **Lloyd's of London** syndicates have **doubled insurance rates** for passenger liability **on U. S. non-skeds.** Rate has gone up from about $100 per seat per year to $200, covering normal maximum liability of $25,000 per seat. Lloyd's syndicates are the only source of this coverage, with the few U. S. underwriters who handle such business reinsuring abroad . . . Some smaller airlines are financially strapped because **Post Office Dept.** hasn't been able to pay them for carrying the mail during part of last fiscal year (AMERICAN AVIATION, Aug. 1). Reason is that 3rd deficiency bill hasn't passed. To help out, the PO made immediate payment to all carriers of 98% of their air mail bills for July, first month of new fiscal year. PO usually pays only 75% to 90% pending final accounting.

Making It Tough to Merge

Although the **Civil Aeronautics Board** has insisted that it favors airline mergers, it is making it tough to consummate any. Latest example is proposal of **Monarch Air Lines,** which serves the Rocky Mountain area south of Denver as far as Albuquerque, to acquire the certificate of **Arizona Airways,** a feeder which has been unable to start operations. However, CAB may turn the case into a long, drawn-out hearing with interveners, applicants, petitioners, etc. One transcontinental line is already in the case. If it's going to turn into a mammoth legal proceeding, chances are the proposal will be withdrawn. Yet CAB officials say privately they'd like to see some of the feeders merge.

Aviation Legislation

It doesn't look as if any legislation will be passed by the current Congress as a result of the extensive hearings that were held on the **airlines' financial condition.** So says **Sen. Edwin C. Johnson** (D., Colo.), chairman of the Interstate and Foreign Commerce Committee, who conducted the hearings. He admits one possible exception may be **a bill separating mail pay and subsidies.** There's practically no chance for **prototype aircraft legislation** . . . A letter protesting the **U. S.-Canada air transport agreement** was signed by 49 Senators and sent to President Truman. They asked him to prevent implementation of the agreement until damages to U. S. companies are remedied. **Colonial Airlines** has been actively opposing the agreement.

Successful Meeting

Substantial progress toward ironing out problems of **use charges at major airports** was made in an informal meeting of airline presidents and airport managers, held recently in Washington under chairmanship of CAA Administrator Del Rentzel. No conclusions were reached, but many areas of agreement were found, and the meeting is being hailed as the most constructive move to date in reaching an understanding. Another session is planned.

Shifting the Burden

To relieve CAB members from participation in routine proceedings, CAB **examiners are being empowered to make initial decisions** after Sept. 2 in uncontested domestic route cases which propose certificate changes, additions or deletions. Their decisions become decisions of the Board unless someone takes an appeal to the Board within 15 days, or the Board itself directs a review. It's an encouraging trend toward giving members more time for the larger cases. In the past they've made all decisions in economic cases.

More Airline-Airport Lease Trouble

An airport-airline dispute developing in Chicago may in some respects parallel the prolonged lease fight between the carriers and the Port of New York Authority. An effort by the City of Chicago to repudiate long-term leases negotiated with the airlines in 1942, by amending the lease ordinance to incorporate higher landing fees for cargo planes, is being opposed by a joint airlines' committee headed by Ray W. Ireland, v. p.-administrative for United Air Lines. Chicago leases are to run until 1964, when they are renewable for an additional seven years. However, with Chicago Municipal running in the red, city officials are anxious to tap the airlines for more money. "The city," Corporation Counsel Joseph Grossman recently declared, "never had the power, and no city has the power, to fix fees that are so unalterable that they will be a burden on the taxpayer."

More Revenue for SF Airport

San Francisco Airport is going to cut out free parking and charge for the use of its lot. It will sign a contract with an operator on a percentage of gross receipts, and anticipates revenue of $8,000 annually. Fees will be 25c for first three hours, 25c for next 21 hrs. and 50c for each succeding 24 hrs.

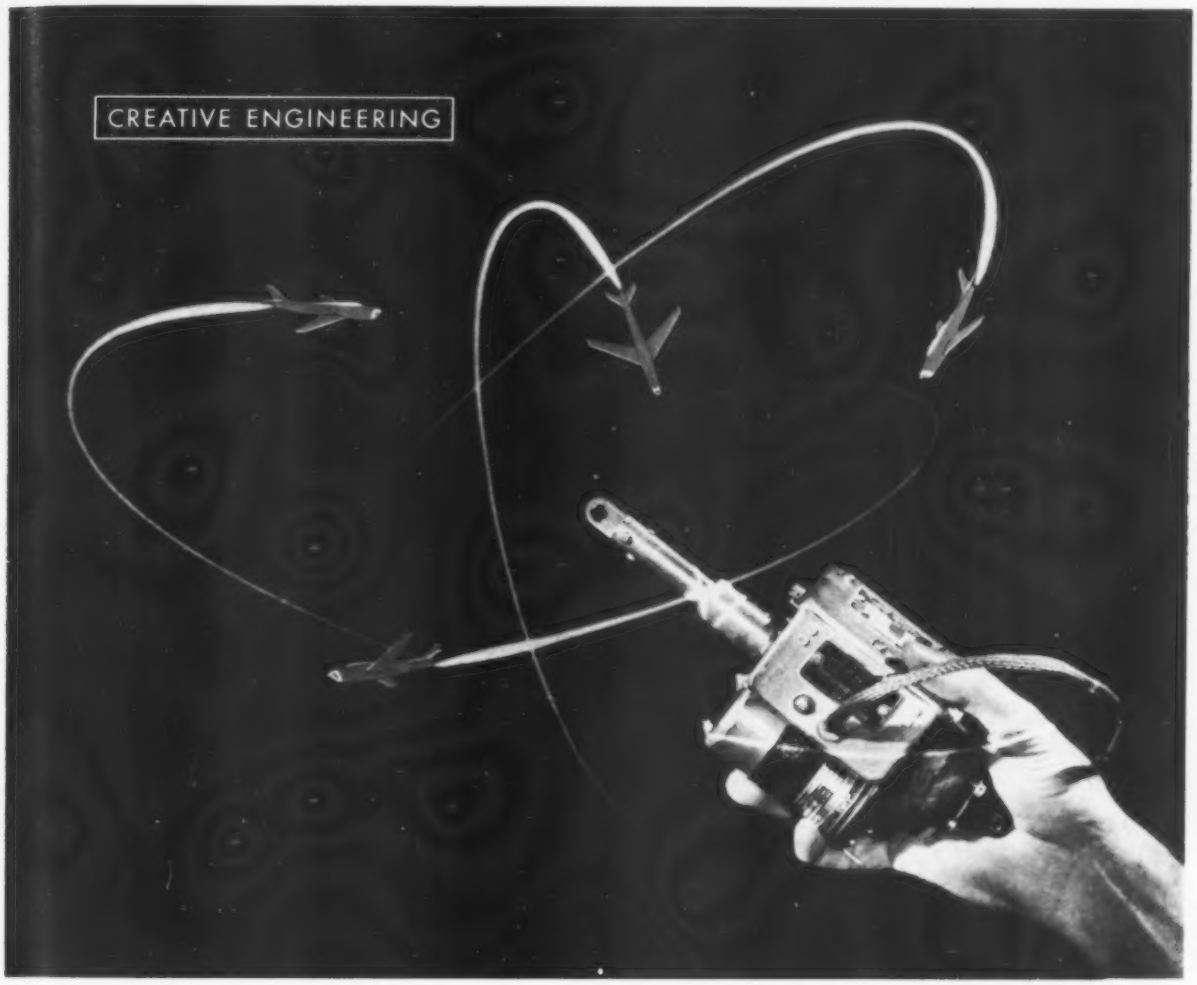
People

S. L. Shannon, vice president-operations of **Eastern Air Lines,** was awarded a 20-year "Hat in the Ring" pin by **Capt. Eddie Rickenbacker,** EAL president, on Aug. 1 en route from Miami to San Juan on a 15,000-mile air tour of South America and Mexico. . . . **Rep. Alfred C. Bulwinkle (D., N. C.),** ranking Democratic member of the House Interstate and Foreign Commerce Committee, and who has long been identified with aviation legislation, will retire at the end of this term of Congress.

T. E. Braniff, president of **Braniff Airways,** and Mrs. Braniff, are on an extended air trip through Europe, and will return about Oct. 1. Mr. Braniff will attend the IATA meeting at The Hague Sept. 12-16, and the remainder of the time will be spent sightseeing and visiting headquarters of European airlines . . . **Croil Hunter,** president of **Northwest Airlines,** also plans to attend the IATA meeting and to visit the Scandinavian countries. . . . **H. M. Horner,** president of **United Aircraft Corp.,** is on a four-week visit to European aircraft manufacturing and airline centers.

R. E. Whitmer resigned last week as TWA's manager of cargo sales. He is expected to devote full time to his own business interests in Kansas City. . . . **George Roper,** who has been first secretary and civil air attache at the U. S. Embassy, Ottawa, has been named first secretary at the embassy in Mexico City. He will handle civil aviation. . . . **Raymond W. Stough,** director of CAB's Alaska office and former director of CAB's bureau of economic regulation, has retired after 38 years of government service.

Three airline executives are on the **U. S. Chamber of Commerce's** newly-enlarged transportation and communication department committee. They are **J. H. Carmichael,** president of **Capital Airlines; C. R. Smith,** president of **American Airlines,** and **Robert J. Smith,** president of **Pioneer Air Lines.**



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Split second maneuverability in today's sonic speed aircraft demands electric controls that respond instantly.

AiResearch engineers have solved this problem by developing a linear-type actuator with a torsional friction non-jamming stop. Instead of the usual solid bar jack screw, this new actuator contains a torque bar *inside* the jack screw.

The torque bar acts as a torsional tension, or compression spring, as it encounters friction at the limit of the actuator stroke. It stores energy from this friction, as well as from the inertia energy of the motor, and uses this energy to help the motor start the actuator's reverse stroke instantaneously.

Actuators made by AiResearch are among the few types in the world capable of passing rigid military specification AN-M10a. AiResearch makes both linear and torque actuators (AC and DC).

● Whatever your field—AiResearch engineers—designers and manufacturers of rotors operating in excess of 100,000 rpm—invite your toughest problems involving high speed wheels. Specialized experience is also available in creating compact turbines and compressors; actuators with high speed rotors; air, gas and fluid heat exchangers; air pressure, temperature and other automatic controls.

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EDITORIAL

(CONTINUED FROM PAGE 1)

diverted passengers would have represented $763,774 in revenue at the regular fare level—or 51% of the total.

Now if all carriers were rolling in money the results of the questionnaire wouldn't be so important. In fact they would be a cue to reduce the basic per-mile fare on a nationwide basis. But such isn't the case.

Significant to note is the fact that one of five airlines already has discontinued its coach-type service. Mid-Continent Airlines, operating a 4 cents per mile service between Kansas City and the Twin Cities since March 1, canceled its tariff on August 11 because the service was "not sufficiently profitable to warrant continued operations." Even during the heaviest traffic months sky coach service had not lived up to expectations.

THERE isn't anything magic about air coach. You just get less for the product, that's all. If you can keep costs down and increase total revenues by selling many more units even at a lower unit price, then it makes sense. If you divert from your own traffic and the traffic of other carriers, and your costs go up as well, and you don't improve your basic financial condition—then you're just batting your brains out carrying more people at the same total revenue or even less total revenue. If your mail pay is doubled, then you can show some wondrous results—but the results are due to mail pay, not to improvement of total passenger revenues.

Capital Airlines used some praiseworthy initiative and stepped out in front among the scheduled carriers with the first air coach service. We have a very high regard for the manner in which Capital's president, J. H. (Slim) Carmichael, has been pulling the company up slowly from what looked like an impossible financial muddle. We have high regard, too, for the aggressive selling of Jim Austin, the v.p.-traffic. But the results of air coach service on Capital (and the other coach experimenters follow pretty much the same pattern) give one much food for thought.

In the first quarter of 1949, Capital increased its passenger revenues by $599,539 over first quarter of 1948, a very hefty jump upwards. But its operating costs went up by $818,489. (It had 36,704,000 more available seat miles). Its net operating income *before* mail pay was a loss of $1,801,094 in 1948, and a loss of $1,364,535 in 1949. But with an increase of $786,307 in mail pay, Capital was in a far better over-all financial condition this year than it was in 1948—a $353,480 loss instead of $1,076,346.

In April of this year, Capital boosted its passenger revenues $378,905 over April of last year. But its operating expenses went up $244,552. It carried 109,897 passengers as against 89,041 last year and it operated 11,422,000 more seat-miles available. It reported a net operating income of $198,542 for the month as against a net operating loss of $129,465 last year. But its mail pay of $310,861 was up $131,362, which afforded a real cushion. The big question is, of course, has air coach business really paid off, or has it represented a diversion not only of an individual airline's business but of the business of other carriers? Capital, for example, has improved its over-all financial position greatly, but there's no use glossing over the fact that mail pay has been a substantial factor. The true test is what can be done without mail pay, never forgetting for a moment that every airline is entitled to reasonable mail pay for services rendered to the government.

As we have said on numerous occasions before, the industry-wide goal must be to reduce basic fares the moment this is possible through reduced costs of producing the product. There's no doubt about the potential market—if the fare were one cent a mile there wouldn't be enough airplanes existing in the world to carry the traffic. But there's no sense in pricing a product below cost and there's no use trying to fool one another about catch-names like air coach. The CAB questionnaire was very valuable if for no other reason than its revelation of the high percentage of people who would have traveled by regular-fare airplane if the bargain rate air coach hadn't been available.

Aviation Pays Off To K.C.

NO GREATER TESTIMONY to the growing importance of aviation to community economics can be found than the study made a few months ago by Dick Challinor, aviation commissioner of the Kansas City Chamber of Commerce. He set out to prove to Kansas City that its investment in airports had paid off. What came out of his study is food for thought to every American community.

One item alone was quite startling. Enough aviation gasoline is consumed by the Kansas City air industry to keep 100 average filling stations in operation for a year. Since there are fewer than 550 gas stations in the city, this meant that about one out of every five gallons of gas sold in Kansas City was used by the aviation industry. One out of every five gallons! And when a DC-6 or a Constellation fills its tanks, it is equal to enough gasoline to keep the average automobile on the road for seven and one-half years. These are figures that Kansas Citians can understand and appreciate.

Aviation's payroll in Kansas City was $25,268,845 in 1948—no small change for the city's retailers. Of this total, almost $18 million went to employees of airlines, $3.6 million for Army and Navy payrolls, $1.9 million for CAA employees, $1 million for aircraft suppliers, $665,000 for private operators, and $163,000 for air cargo companies.

This huge annual payroll meant $5.9 million to grocery stores, $2.8 million to clothing stores, and $3.8 million for rents and home payments, to list a few outlets. These are figures that talk to banks and businessmen and city officials. Challinor's presentation of what aviation means to Kansas City is one of the best we've seen. Kansas City has a total investment of $5,000,000 in its three airports, representing money spent by local taxpayers since 1929. In 1948 alone this total investment was paid back five times in payrolls alone. It's a remarkable achievement.

WAYNE W. PARRISH

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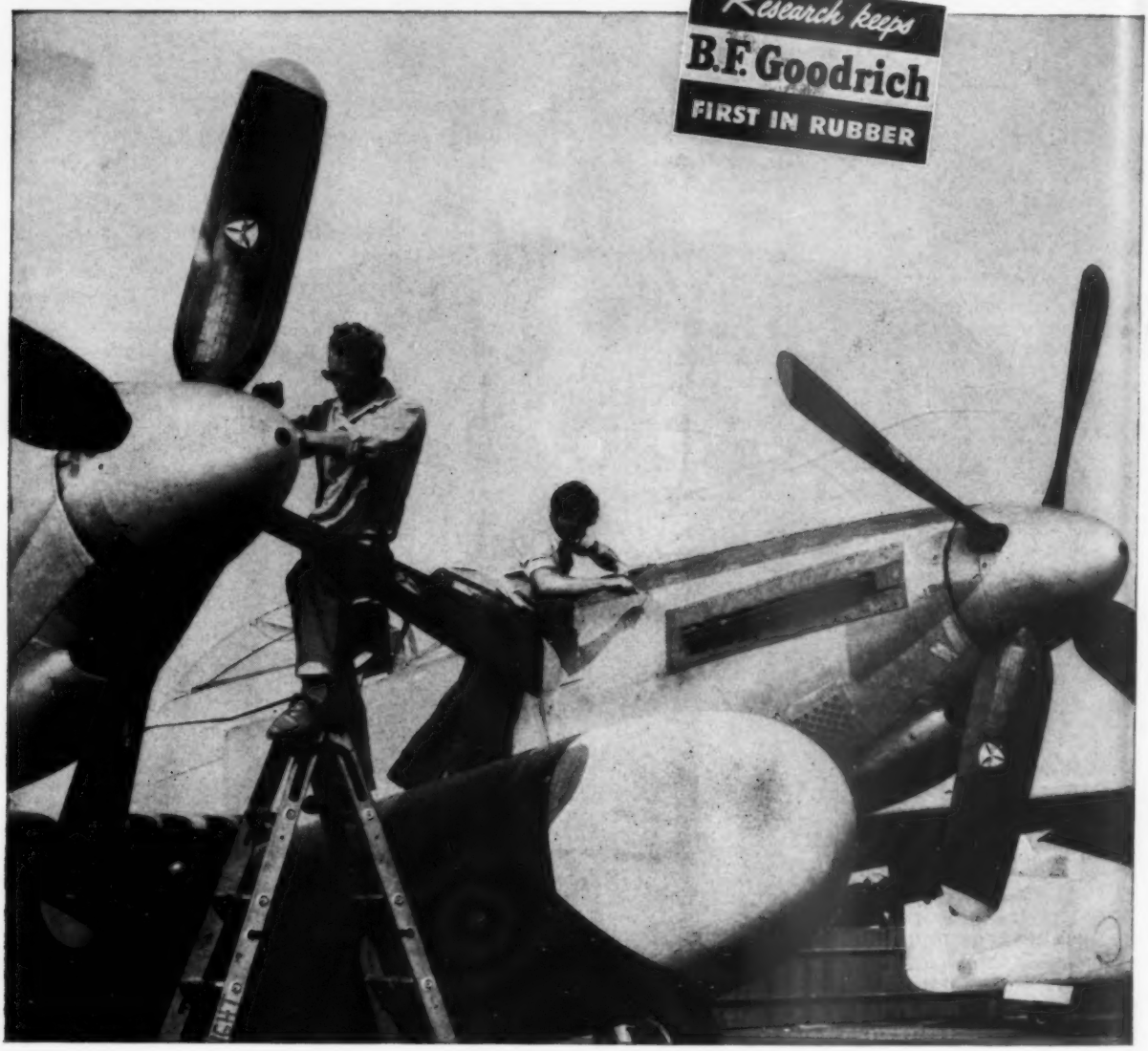

The fighter whose shoes wouldn't fit

THIS all-weather fighter, North American's F-82, had to have heated propeller shoes for ice protection. But because of a hump at the base of the propeller blade, no shoe made would fit!

B. F. Goodrich engineers tackled the problem. They started with electrically-heated rubber—a thin, tough rubber pad with a core of resistance wires—and developed a special shoe.

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If you have an icing problem, why not get the expert help of B. F. Goodrich engineers? Write to *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

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American Aviation

Volume 13
Number 6

Britain's Jet Transport Challenges U. S. Air Industry

First flight of the world's first jet airliner, the de Havilland Comet prompts the question of why the United States has been left behind in this development. The Comet made the flight on July 27, less than three years after the start of the design and development program. Already the production line is in operation with several ships well along. (See cut on next page.)

Yet with initial commercial operation of the Comet set for 1952-53, the U. S. might still make up for lost time.

Possibly this production line offers the answer to why the U. S. has been left behind in the design of a jet airliner. The de Havilland Company emphasizes that the plane was built on the basis "of commercial competitiveness, and on this basis alone." They add, "It is a business proposition. The de Havilland Company took the initiative in proposing the aircraft and in evolving the specification and design, and carries full responsibility, by contract, for performance, cost and delivery dates, with penalties for default."

American manufacturers are undoubtedly willing to take the same risk. They need customers. de Havilland has orders for 16 Comets placed while the aircraft was still on the drafting board; placed on the basis of "their confidence in the de Havilland company's ability to produce transport aircraft outstanding in performance and efficiency."

Fourteen of the jet transports will go to British Overseas Airways Corp. and British South American Airways. The other two are for Britain's Ministry of Supply. Since BOAC and BSAA are both government operated airlines the orders for the entire 16 aircraft are actually government orders, a direct subsidy.

The aircraft industry in the U. S., operators and manufacturers alike, are not against such subsidy, though there are some who don't favor it. Factually, we have been unable to marshall support for the Prototype Aircraft Bill now before Congress to sponsor just such a program.

Suppose Congress should pass prototype legislation. Could we expect success as spectacular as that of the de Havilland Company—a flying aircraft as soon as three years? The Boeing Aircraft Co. in 18 months designed and built the XB 47 all-jet bomber, the plane that broke the transcontinental speed record by a flight from Moses Lake, Wash. to Andrews Field, Md., in 3 hrs., 46 min. It looks as if we could.

Britain Seeks Lead. The first flight of the Comet 106 marks the climax of a British post war program to take the lead in the commercial transport market. During the three years of planning and production which made this flight possible the project was veiled in secrecy. Every phase of design was closely guarded. Only after the first flight were photos of the ship released. Details will not be released until an even later date.

What is this new aircraft? What does it offer?

We know it's a 36-passenger, low wing transport powered by four de Havilland Ghost engines; it was designed to operate at speeds around 500 mph and at altitudes of about 40,000 ft.; the passenger cabin is pressurized for about 8½ lbs. An AMERICAN AVIATION observer was on hand for the taxi tests at Hatfield, England. He estimates the fuselage length at about 100-125 ft. and wing span at 115-125 ft. Gross weight is understood to range between 100,000-105,000 lbs.

The wings have considerable area, bearing out de Havilland's claim that wing loadings are moderate, less than some present day commercial transports, and are of sufficient thickness to bury the Ghost engines almost entirely within the wing root section. Redux metal-to-metal bonding, as used in the Dove, minimizes the use of rivets and simplifies fuel tank sealing problems of the integral wing tanks. Underwing pressure-type refueling facilities are used.

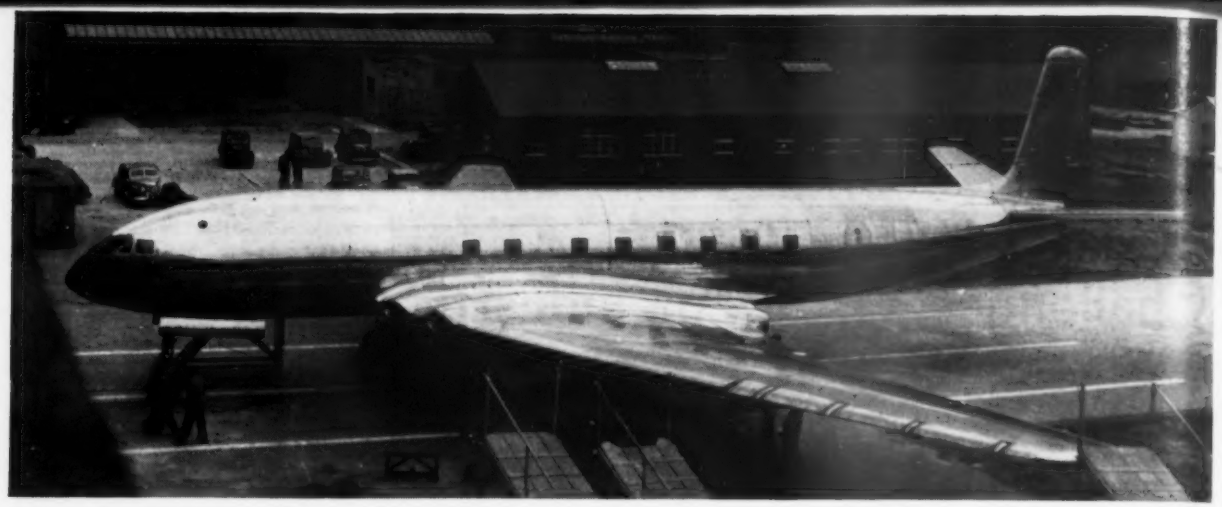
All the controls use mass balances now but earlier plans acknowledged that power controls would be used along with a Smith electronic auto-pilot. Possibly these have not been installed yet, and the balances are a temporary measure. The wing uses slots at the tips and de-icing is provided by heat. Although slotted flaps do not appear to have been used, landing speed is below 100 mph.

The fuselage is about 12 ft. in diameter. The 36 passenger seats are of the sleeperette type, fully reclining. Eight rectangular windows are on each side of the passenger cabin over the main wing centersection. There are two emergency exits on each side of the cabin compartment. Indications are that a private compartment will be at the forward end of the main cabin. Seating, as indicated by window arrangement, has been restricted to areas generally forward of the engine tail pipes.

Single wheel main gear assemblies retract outward into the wing, outboard of the outer engine nacelle. To accommodate the sizeable gear in the thin wing it has been necessary to provide a "bump" on the upper wing surface. Since present plans call for installation of a dual wheel assembly on each main gear it will be interesting to see how this is finally accomplished.

The nose wheel is a dual assembly steerable from the cockpit. A tail skid or strut is used at the far end of the fuselage just under the empennage. With so much stress laid on clean aerodynamic form in jet aircraft, it is surprising that the tail skid does not re-

FIRST FLIGHT PHOTO of the Comet 106 gives a good idea of the clean design of the first jet transport. This is particularly true around the nacelle area as compared to present day transports. The single wheel gear assemblies retract outward into the wing area outboard of the engines. Note the difference in air inlets on the inboard and outboard engines.



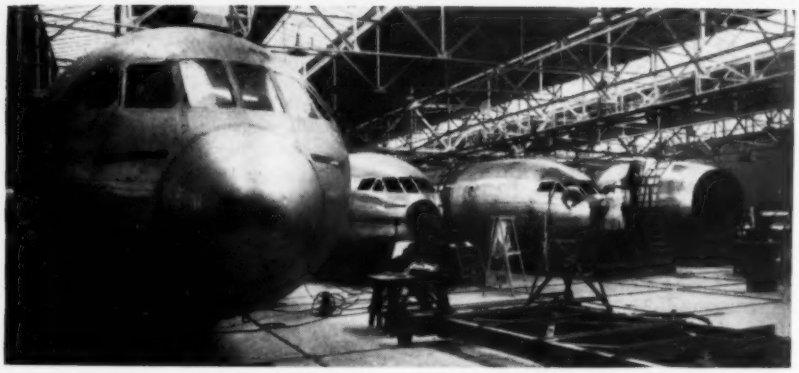


PHOTO ABOVE SHOWS more details of the de Havilland jet airliner design than any of the others published to date. Some idea of the sweep-back in the wing, about 25 degrees, can be formed. The tail assembly is almost identical in appearance to the original design of the Martin 2-0-2 prior to its certification.

SIXTEEN COMETS were ordered while the aircraft was still on the drawing boards. On March 30 of this year de Havilland announced that production of these ships would start immediately. Now five months later this photo (left) showing the production line affirms that progress has been considerable.

tract. A fairing door used over the main wheels bulges slightly below the outline of the wing to complete the housing. The fairing hinges from the outboard end of the wheel well inward. The odd configuration above and below the wing circumvents a problem in gear design for thin wings.

Power Plants. The Ghost engines, mounted in pairs in the wing root on each side of the airplane, are rated for 5,000 lbs. thrust. Air inlets are designed so that air entering the engine passes through the front spar to the single sided centrifugal impeller, characteristic design of the de Havilland engine.

Over all diameter of the Ghost is 53 in.; length 115.5 in.; dry weight 2011 lbs.

While the static thrust rating of the Ghost engine is 5,000 lbs., it is not considered that the engines now installed are capable of over 4500 lbs. thrust. The Goblin engine, highly developed predecessor to the Ghost, is only rated at 3600 lbs. at this time.

Since commercial operation of the jet airliner is not expected until 1952, it is likely that higher thrust will be available. Present day approved overhaul periods for the Ghost are at 250 hour intervals.

Meanwhile it has been necessary to install cold rockets in the wing center-section between the dual pairs of ghost engines. BOAC, de Havilland's primary customer, is not enthusiastic over use of cold rockets, but according to Whitney Straight, take off run of the Comet is "very long." If menthol water injection or some more conventional power producing system could have been used the cold rocket probably would not.

Cruising Speed. The need for this additional power has raised the question of cruising speeds. While basic specifications call for a cruising speed around 500 mph, observers claim that the present day Ghost will not permit more than 450 mph. Since power increases in jet engines do not call for radical engine changes, but simply metallurgical advances which will permit higher operating temperatures, it is felt that by 1952 the engine may be developing up to 5500 lbs. thrust with resulting cruising speed of 520 mph and abandonment of the cold rockets.

It's still too early to judge performance. The first flight lasted 31 minutes, the aircraft reached a maximum altitude of 10,000 feet. It is a basic fact that jet aircraft must operate between 35-40,000 feet to permit maximum speeds and reasonable operating economies. de Havilland's chief pilot, John Cunningham, captain of the five man flight crew making the July 27 flight, reported that handling qualities through low and medium flight speed were checked, the aircraft handled "very nice" in the air and on the ground.

The Comet begins a new era in transport aircraft. As the first jet aircraft in commercial use it will open many doors. It will give the entire industry factual data on traffic control problems, maintenance and communications difficulties posed by this type aircraft. Whether it will prove to be the "mainliner of the world," as some enthusiasts claim it will, remains to be seen.

British-U. S. Plane Comparison

The following table provides some indication of the relative size and performance of the de Havilland Comet and two U. S. transports, the Lockheed Constellation L749 and Boeing Stratocruiser.

	Comet 106	Constellation	Boeing 377
Gross Take-Off Weight	105,000 (approx.)	107,000 lbs.	142,500 lbs.
Maximum Cruising Speed	500 mph	271 mph	312 mph
Passenger Capacity	36	51	75
Wing Span	125 ft. (approx.)	123 ft	141 ft.
Length	100-125 ft.	95 ft.	110 ft.
Powerplants	de Hav. Ghost	Wright Cyclone	P & W 4360
Rating	5,000 lb./thrust	2500 hp.	3500 hp.

EAL-Navy Air Collision Highlights Airway Hazards

By GERARD B. DOBBEN

A buzzing accident which cost the lives of 15 passengers and crew of an Eastern Air Lines DC-3 and a Navy fighter pilot near Fort Dix, N. J., July 30 caused a clamor in industry circles and on Capitol Hill for CAB and Congressional action to prevent a recurrence.

When the pilot of a Navy F-6-F Grumman Hellcat, after previously buzzing a light commercial plane, crashed into the side of the airliner on its New York to Washington flight, the whole question of military flying in and near the civil airways came into sharp focus. Sen. Edwin C. Johnson (D., Colo.), chairman of the Senate Interstate and Foreign Commerce Committee, declared the military must assume greater responsibility for disciplining pilots who buzz civil aircraft or perform acrobatics on the airways.

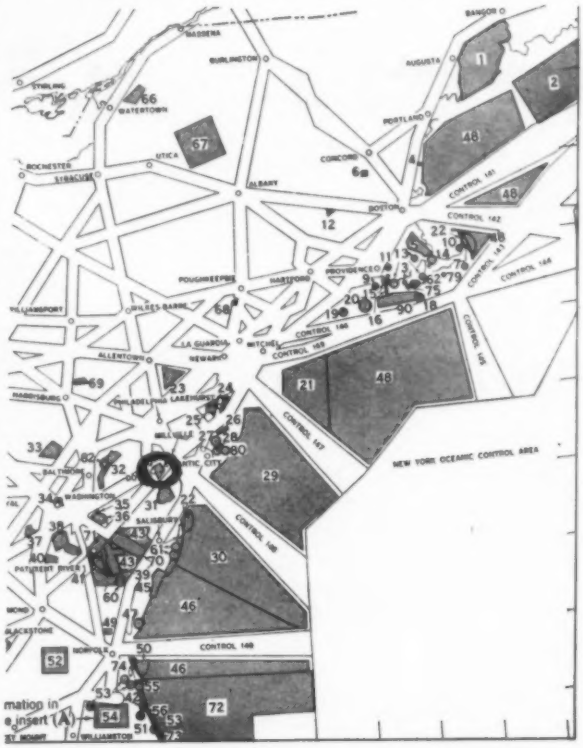
More drastic action was recommended by Robert M. Love, president of All American Airways, who said that Congress should take steps to eliminate military flight training in the populous eastern seaboard area. He contended that even the Civil Aeronautics Board, under its broad authority, has the power to limit and control military flying in peacetime.

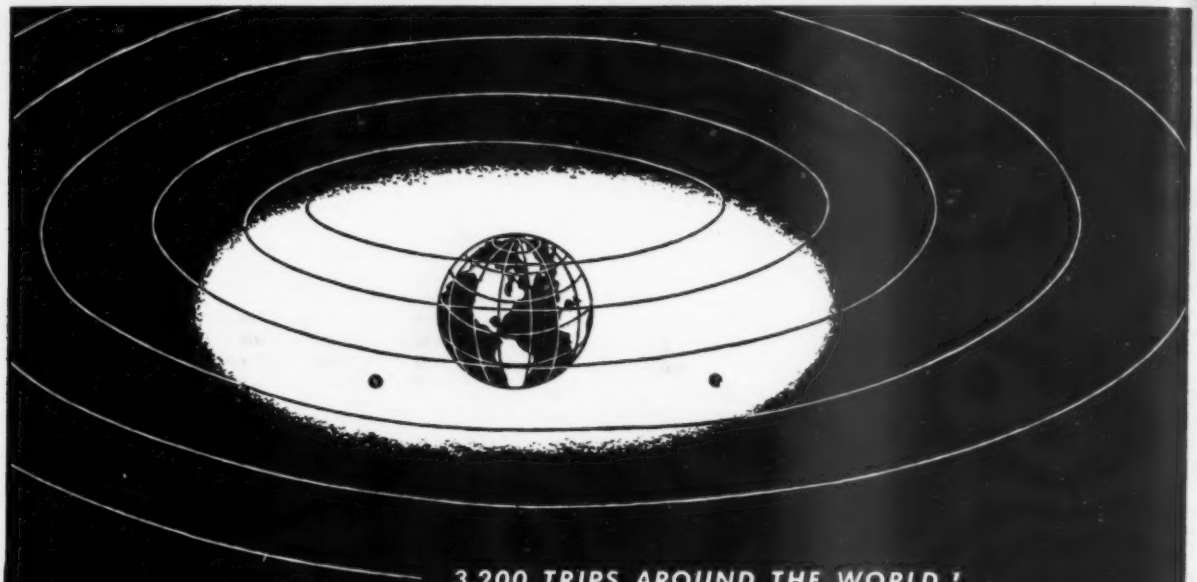
There was no denial that the Navy pilot had violated regulations and a Navy spokesman expressed the regrets of the Secretary of the Navy for the mishap. But it was emphasized there is little of a regulatory nature that can be done as present rules against buzzing are very stringent. A reserve officer found guilty of buzzing is, in a majority of cases, forced to return to inactive status, a regular Navy officer is usually permanently grounded. Punishments are similarly severe in the Air Force.

No Formal Complaints. Civil Air Regulations, promulgated by the Civil Aeronautics Board, prohibit acrobatics on the airways but CAA officials, representing the enforcement agency, said no formal violations had been filed with it for buzzing incidents of this character in two years. CAA said in most cases the incidents are handled on a regional basis as between military and civil authorities. One government official said there was "too much trading of favors" between civil and military authorities to assure good enforcement.

But when the Air Coordinating Committee, which through its Air Space subcommittee designates the military danger areas for the protection of civil aviation, stated that these danger areas are well off the civil areas, All American's president took issue. Love said the eastern seaboard was honeycombed with them, some of which were less than five miles from civil flight paths.

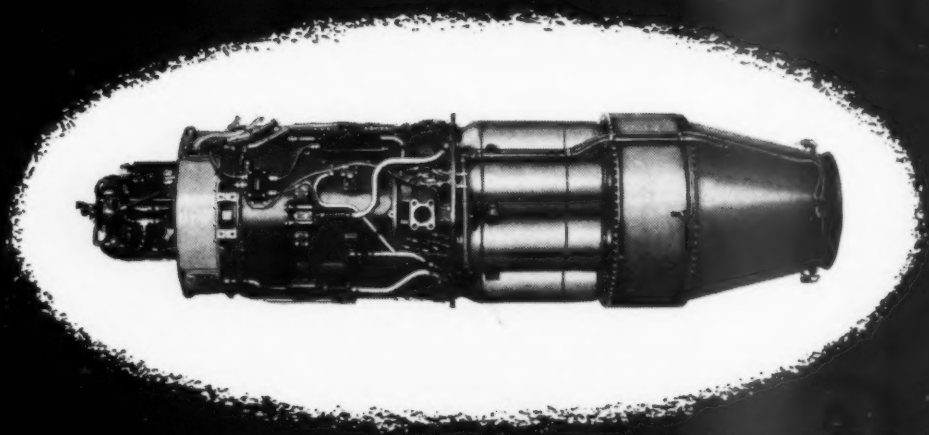
Love said that on Green Airway 5, near Little Creek, Del., there was a danger area in the middle of the airway. He said All American planes, in serving nearby Dover eight times a day, "had to go through a wringer to make their landings." The Air Force conducts air-to-ground gunnery at this military reservation. ACC officials said the next day that this military activity is slated to be discontinued on September 1.





3,200 TRIPS AROUND THE WORLD !

Allison aircraft turbine engines have logged more than 200,000 hours' actual flight time to date — more time in the air than all other jet engines.



J35 Axial-flow Turbo-jet

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Battle of Pilot Unions Approaches Climax at NAL

Procedures which may result in the first collective bargaining election in the history of pilot-management relations in this country have been set in motion by the National Mediation Board as a somewhat delayed development stemming from the National Airlines pilot strike of last year.

The Board has set Aug. 23 at Miami as the date and place for a hearing to determine the eligibility of voters in an election to decide whether the Air Line Pilots Association or the newly organized National Pilots Association shall represent National's pilots as bargaining agent. The Board itself will conduct the hearing.

When representatives of the two associations met under NMB auspices and were asked for their views as to who should be permitted to vote, Arthur H. Courshon, NPA counsel and advisor, said he was willing to have all of National's pilot employes vote.

After some discussion, Board representatives decided to give David L. Behncke, president of ALPA, 20 days to file written views as to who should or should not be permitted to cast their ballots. One of the questions in controversy is the status of pilots on furlough.

NPA officials, at a press conference later in the day, said that more than 51% of National's pilot employes had petitioned for the election. Courshon said that the new union has more than 450 members, including beside National pilots many of the scheduled and non-scheduled flyers in the Miami area. Membership in the new association is open to all commercial pilots. Courshon estimated there are 60,000 pilots in the country today who are making some form of living from commercial flying.

NPA Objectives. During the press conference, the NPA officials said that one of the principal objectives of their association is to break up the present seniority system of the Air Line Pilots Association which was charged with creating a condition which affects the safety of airline operations.

Courshon explained that his association seeks to substitute for the ALPA seniority rule a system based on "foggies" which will permit older pilots to receive seniority pay without the necessity of flying larger, heavier and faster aircraft. He said that under ALPA's present contracts, older pilots must bid to fly the larger planes in order to receive the wage increases which are based on a formula geared to the weight and speed of the aircraft. Richard Hettenbaugh, president of NPA, said that the wage differential between captains flying a DC-3 and a DC-6 could be as much as $400 a month and that economic considerations almost compelled older pilots to bid to fly the heavier equipment.

The question of the proficiency of certain pilots flying the heavier equipment today was raised by the NPA officials who said American Airlines was forced to close its Ardmore, Okla., training base when Behncke insisted, under threat of reprisals, that the senior pilots be given the right to fly the heavier equipment even though they had failed to qualify under the re-training process. They claimed that American officials abandoned the re-training program at Ardmore when it appeared the desired results could not be achieved.

NPA officials said that when American sought to have the Civil Aeronautics Administration take over the Ardmore plant and conduct the retraining program under government supervision, Behncke blocked the move.

NPA Confident. Obviously confident that his association will win the election, Courshon revealed that the association's campaign is being centered on the so-called plight of the co-pilot. Courshon contends that many of the older pilots personally would prefer not to fly the heavier equipment but are almost compelled to do so to obtain the increases in pay to which they are entitled on a seniority basis. This has tended to block the normal promotion of younger pilots, Courshon maintains. He further claimed that the new association guarantees co-pilots equal representation in pilot affairs, a condition which he asserted does not exist in ALPA's organizational structure.

Courshon revealed that his association has applied for affiliate membership in the Brotherhood of Locomotive Engineers and that Alvanley Johnson, president of the engineers, has expressed a willingness to discuss affiliation after the jurisdictional fight among the National Airlines' pilots has been settled.

The new association maintains offices in Suite 315, 14 N.E. First Ave., Miami.

ALPA Presents New Demands In Contract Negotiations

In opening contract negotiations with American Airlines last week, the Air Lines Pilots Association is understood to have set forth an entirely new concept of flight time limitations based on miles flown, keyed to types of aircraft and with provisions for maximum daily on-duty time. These demands are expected to set the pattern for negotiations with all the airlines.

Indications are that the pilots will ask for a monthly flying limitation of 17,500 miles on DC-6 aircraft and 14,000 miles per month on Convairs at the same pay they now receive. This compares with about 20-21,000 miles now being flown each month by DC-6 crews and 16-17,000 miles in the Convair. Increases in vacation and sick leave benefits will be sought for all members.

In addition, pilots will seek a maximum daily limit of 12 hours on-duty time while co-pilots will seek equipment differential pay and higher rates for night flying.

NAL Upheld in O'Neal Case

Nearly four years after an accident which later resulted in the pilot's dismissal and led to the longest pilot strike in airline history, a neutral referee on Aug. 8 found that Capt. Maston G. O'Neal, of National Airlines, used poor judgment in landing a Lockheed Lodestar at Tampa Airport, Sept. 13, 1945, and that the company was wholly within its rights when it discharged him.

The decision was rendered by I. L. Broadwin, New York lawyer chosen as neutral by the Air Line Pilots Association and NAL after the 11-month old pilot strike over O'Neal's dismissal was settled last November.

Feeder-Liner— Shown above is the prototype Percival Prince, the 8-10 seat feeder airline ship which has been undergoing tests in varying climatic conditions. Three aircraft are being used in the widely spread test program in England, Africa and India. Ten airplanes are on order. The Prince is powered by two 520 hp Alvis Leonides engines. Cruising speed at 36% T.O. power is 145 mph., gross wt., 10,650 lb.; span, 56 ft.; length, 42 ft. 10 in.; height 16 ft. 1 in. Maximum range 743 miles.

Outlook Improved For G. I. Flight

Prospects were good last week that fixed-base operators may soon experience a helpful revival of G.I. flight training business. Flight school operators throughout the country who had been hard hit during the past year by the Veterans Administration's policy of requiring "complete justification" for approval of applications, could find encouragement in Senate action liberalizing eligibility requirements for G.I. flight training.

Under new provisions of H. R. 4177, which was sent to conference with the lower House, all physically qualified veterans should be able to get G.I. flight training if they supply VA with an affidavit, supported by two corroborating affidavits, stating that the training is desired for use in connection with present or contemplated business or occupation.

The liberalization was added in the Senate Appropriations Committee through efforts of Sen. Elmer Thomas (D., Okla.). If the House concurs, as expected, then the burden of proof goes on VA to disallow an application rather than on the veteran to justify it.

Operators would do well to re-check their list of veterans who failed to qualify during the past year. Under new provisions, these applicants may represent a good source of business during the current flying season.

The depressing effect of past VA policy on G.I. flight training was shown in latest government figures which reveal that on June 30, 1949, there were only 36,745 veterans taking flight training. This represented a 33% drop (18,798 students) from enrollment of 55,543 on last Dec. 31, directly contrary to seasonal trends of aviation activity.

A study of the one year under VA policy of requiring "complete justification" as a condition for approval shows that from July 1, 1948 to and including June 30, 1949, there were 52,895 G.I. applicants, of whom 28,545 were given immediate approval for flight training and 24,350 sent to advisement. Of the 24,350 deferred, 7,436 completed the processing with 3,790 approved and 3,646 rejected.

There was little uniformity in VA action on applications, there being almost as many interpretations of rulings as there were regional offices. Thus, for example, during the last six months of 1948, the Columbus, O., branch office approved almost 78% of all applicants, the Philadelphia branch about 50%, and the St. Paul, Minn., branch only 25%.

Midget ILS Being Studied

Possibility that a midget Instrument Landing System may be used at some airports was raised by F. B. Lee, deputy administrator of CAA, speaking at annual meeting of the Corporation Aircraft Owners Association in Washington. The system might not use a glide path.

New Formula Needed

Many of the complaints about aircraft short-comings voiced by members of the Corporation Aircraft Owner's Association are the same "squawks" that were heard 15 years ago.

That's the conclusion of Robert Aldrich, director, Minneapolis-St. Paul Aviation Authority, and one of the speakers at the recent CAOA forum in Washington. Said Aldrich, "It's still the squeaking wheel that gets the grease." The difference between today and 15 years ago is that we now have organizations to handle the complaints, a means of doing something about them.

WILLIAM B. BELDEN, chairman of the board of CAOA, greets Joseph T. Geuting, Jr., manager of the Personal Aircraft Council of AIA, who spoke at the meeting on cooperation between the two organizations.

Aldrich is right. There are now organized groups that can handle complaints and get constructive action. For the owner of an executive aircraft the CAOA is that organization. But while there are over 2500 executive transports, mostly twin engine aircraft, there are only about 60 members in the non-profit organization formed to sponsor their cause and protect their rights.

Frankly, the one-day forum was a failure in several ways. It failed to gain attendance, it failed to stir interest and even finished off the seven and one-half hour day ahead of schedule. All the problems were solved in this period with time out for lunch.

In every day operation, and in regular forums, the CAOA can accomplish a great deal. It has proven this during its short life. But it must get more support from today's members and more members for tomorrow.

The forum in Washington was called to discuss problems of the aircraft owner. In a hall which would handle 200 people, the total accumulated attendance, including the speakers, guests and press, was only 62. Less than half the attendance represented membership. The speakers, eight in all, presented their speeches in fine form. But, no one offered a challenge.

This appears to be where the meeting failed. There must be a number of challenging problems facing the executive aircraft owner. Certainly there are many fronts on which coordinated action could bring about financial savings to justify membership in the CAOA and insure more active participation.

The airlines have been able to get refunds from the individual states for fuel taxes; how are the executive aircraft making out? It can represent a sizeable sum of money. What aircraft and engine overhaul times are the various operators experiencing, were there premature failures, is CAA or lack of a planned program preventing extension of these overhaul times?

Has it been possible for members located in the same city to work together and get any benefits from the airport operators, suppliers, etc. by joint group action? Have any operators combined small fleets to justify a maintenance organization and if so have savings actually resulted?

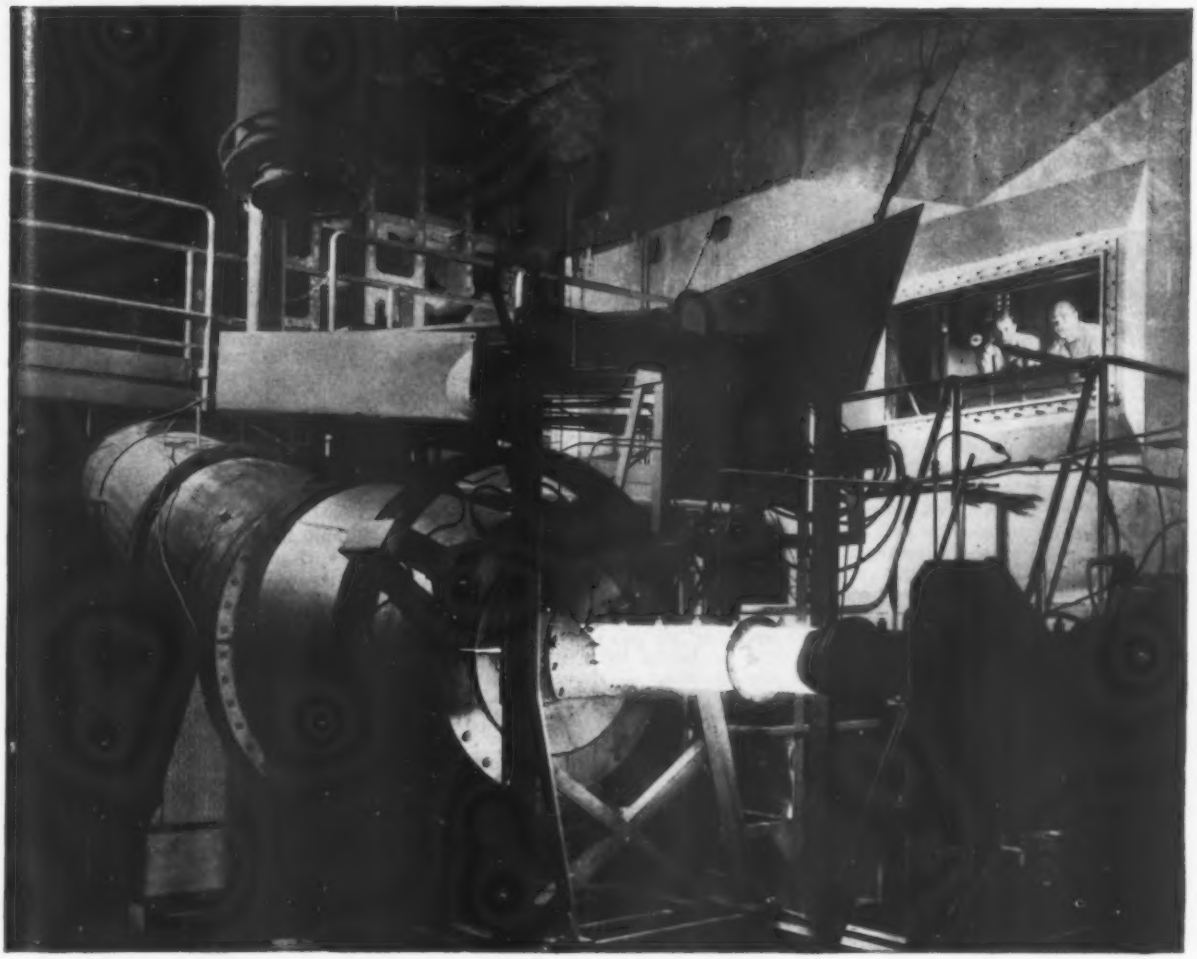
Some executive transport operators have been able to contract maintenance to airlines and in other cases find shelter for their planes in airline hangars. Has this been successful? How much utilization was lost in the past year because ships were out of service pending completion of CAA mandatory inspection or modification work?

If these and parallel fields were explored it would be possible to provide greater economy of operation. Corporations that are having a hard time justifying use of personal aircraft might find it easier to do so and membership could provide a key to concrete advantages.

The CAOA has made considerable progress since its founding. It is a worthwhile organization which is serving a useful purpose. To insure that it will serve its stated aims, there must be active work in promoting increased membership. The best field for this is through proof of the value of membership.

Meetings such as this one, meetings at which everyone gets together, agrees that everything is all right, and then adjourns are not the answer. We agree with Robert Aldrich that the squeaking wheel will get the grease. But the squeak must be loud and strong and based on facts which must be brought out in joint meetings of those concerned.

There are challenges in executive transport operation. Let's not allow a challenge to go unanswered.



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▶ It's a *precision* test . . . the test rig simulates conditions that a combustion system encounters in a ram jet operating at supersonic speed.

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Idlewild Agreement May Set Pattern for Airport Charges

The two-year deadlock between the major airlines and the Port of New York Authority over use of New York International (Idlewild) Airport was settled on Aug. 5 when Gov. Thomas E. Dewey of New York announced that an agreement had been signed by the parties involved. The airlines and Port Authority officials were brought into agreement by Gov. Dewey after 23 hours of continuous negotiation.

The airlines, Gov. Dewey said, will pay a flat fee for every flight, an arrangement which will result in their paying "very much more" than under the 1945 leases signed with New York City. He added that "in many respects I believe the rest of the country will follow the pattern of our airport agreement."

Signing the agreement for the airlines were Juan Trippe, president, Pan American Airways; C. R. Smith, president, American Airlines and American Overseas Airlines; and J. R. Stainton, American manager of British Overseas Airways Corp. These are the airlines which are or will be operating Stratocruisers.

Not present were TWA, United, Capital, and Eastern, but they will be encouraged to sign. The agreement is subject to approval of the airlines' board of directors and the full board of the Port Authority.

Major Points

Principal points of the agreement are:

(1) The airlines and the Authority will prepare new leases for a 25-year period from Oct. 1, 1949, with the object of executing them before that date.

(2) The Authority will join in sponsoring legislation making terms of leases enforceable in the courts, and making the Authority liable to law suits by private companies using the field.

(3) There will be a flat fee for every flight—no decrease as schedules are added. The fee will be on the basis of 12c a thousand pounds of maximum allowable gross weight for each takeoff, and an additional 1.22c a thousand pounds for use of public ramps and apron area facilities.

(4) Fee may be raised by the Authority on or after July 1 of each year by the percentage that cost of providing, maintaining and operating public landing, ramp and apron areas is increased over the costs for the items for the calendar year 1949 by wages and material costs.

(5) Fees may be increased on or after July 1, 1951, and on or after the same date of each following year by the percentage added to present 1949 costs by technical advances requiring additional Authority expenditures; expenditures incurred due to government orders; disastrous damage requiring new capital costs not covered by insurance, and additional expenditures required for reasonably prudent operation.

(6) Authority will undertake hangar construction for the airlines at a charge of 10% of estimated total cost, the 10% to be paid in advance. The airlines thereafter will pay 105% of total cost with interest amortized over a 25-year period, in addition to ground rent at the rate of $1,300 per acre per year. Authority's obligation to build hangars is subject to its ability to sell its securities at reasonable interest rates. Airlines may build their own hangars by paying the above ground rent; ownership, however, is vested in the Authority after construction.

(7) Airlines will pay $6 per square foot in the temporary terminal facilities for counter space, $4 per square foot for other first floor space, $3 for second floor space, and $2.50 for cargo space.

(8) Physical facilities for unloading and storage of gasoline will be provided by the Authority at a fee of 5½ mills per gallon, and the Authority may directly or by contractor provide facilities to handle distribution of gas from storage tanks to planes at a rate per gallon to the airlines "which shall be reasonable."

(9) When planes are parked or stored in aircraft parking or storage space for more than 12 hours after landing, a reasonable charge may be made, the reasonableness to be subject to arbitration.

(10) Airlines and the Authority will surrender all rights under the 1945 leases and the Authority will assign to the airlines appropriate space for their exclusive use.

(11) Airlines may sublet hangar space, but it must first be offered to the Authority at the same rate.

(12) Adequate provision for arbitration is to be made, in accordance with the rules of the American Arbitration Association, with decision of the arbitrator final and enforceable by the courts.

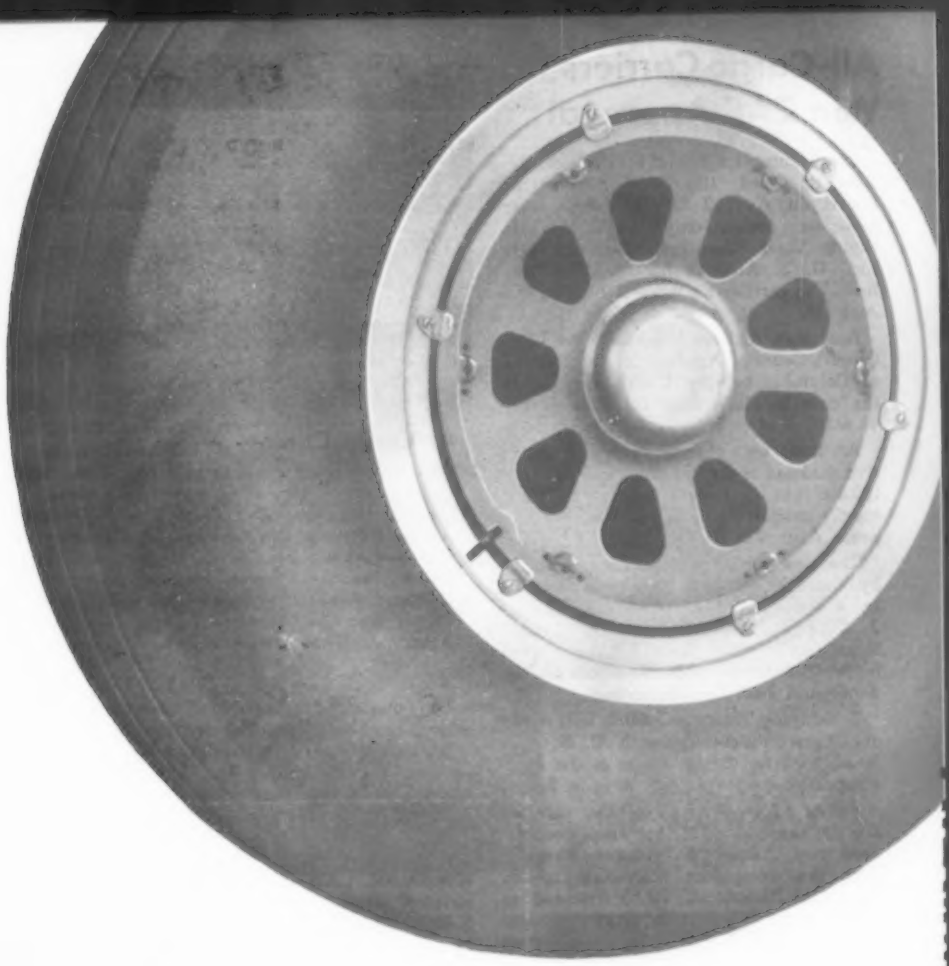
The Authority's obligation to build hangars, it was said, was limited in the agreement to $20,000,000, for which $8,000,000 will be for American, $2,000,000 for AOA, $8,000,000 for PAA, and $2,000,000 for Northeast. No hangars will be built for BOAC. Construction would lapse if payment is not made by the parties by Dec. 31, 1952.

Gov. Dewey said that the "compromise agreement . . . will save years of controversy and will greatly speed up the full use of the airport and reduce the losses." He indicated he had written most of the agreement himself.

EAL Group Heads South—Capt. Eddie Rickenbacker, president and general manager of Eastern Air Lines, a group of EAL operational experts and guests are shown just prior to leaving Miami, Fla., Aug. 1 by Constellation for a month-long visit of South American countries. Front row, left to right: Capt. Rickenbacker; Arthur Godfrey, radio-television star; Aldo de Castro Menezes, consul of Brazil, at Miami, who came to airport to see the others off; Wayne W. Parrish, editor and publisher, American Aviation Publications; David Kenyon, Lockheed Aircraft service representative, Miami; Bert Holloway, sales development manager of Lockheed Aircraft Corp.; Gale Wallace, United Press, New York; S. L. Shannon, v.p.-operations, EAL; and Frank Mattix, manager, interline traffic, EAL.

Second row, l. to r.: William F. Rickenbacker, son of Capt. Eddie; Walter W. Hecht, Win Nathanson & Associates, New York; James Kilgallen, International News Service, New York; J. W. Moore, assistant secretary and treasurer, EAL.

Third row, l. to r.: Bradley Walker, executive v. p., Fletcher D. Richards, Inc., New York; Capt. F. J. Bennett, second pilot; Capt. F. E. Davis, first pilot. Fourth row, l. to r.: Capt. G. T. Munoz, third pilot; EAL technicians E. T. Rasmussen, W. Fruchting, Jr., and R. J. Miller. Fifth row, l. to r.: Flight attendant Arthur J. Gray; Flight engineer E. L. Graham; Flight attendant J. B. Newman.



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All-Cargo Carriers Win CAB Approval

Reaffirming its tentative decision issued in April, the Civil Aeronautics Board on Aug. 2 awarded temporary five-year freight-only certificates to Flying Tiger Line Inc., Slick Airways Inc., U. S. Airlines Inc. and Airnews Inc. The certificates were to be effective Aug. 12.

American Airlines has asked the U. S. Circuit Court of Appeals for the District of Columbia to stay CAB's decision in the case to allow time for judicial review.

An important change from the tentative decision is a stipulation in each certificate that the freight carriers shall not handle property shipped by Railway Express Agency.

The case, which was contested bitterly by the scheduled airlines, was decided by a 3-2 vote. CAB Chairman Joseph J. O'Connell, Vice Chairman Oswald Ryan and Member Russell Adams voted in the affirmative, with Members Harold Jones and Josh Lee dissenting.

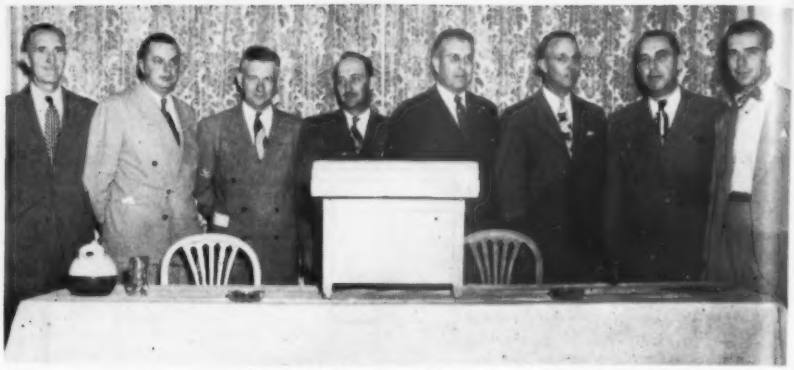
The Flying Tigers and Slick will operate transcontinentally, with U. S. Airlines flying north-south east of the Mississippi, and Airnews operating in Texas.

Points to be served by the carriers are the same as in the tentative decision (see map, AMERICAN AVIATION, May 15) with the exceptions that Birmingham, Ala., and Richmond, Va., are added as points on U. S. Airlines' routes, and Richmond added as a point to be served by Slick.

In barring these carriers from handling REA business—a move that had been urged by the airlines—CAB asserted "it is plain that the certifications herein decided will not result in any substantial diversion of *past* or *present* business. On the contrary, it is our contemplation that the air freight business of the combination carriers will continue to grow . . . Moreover, we will remove . . . any possibility of diversion from the presently-certificated carriers of express revenues derived from air express generated by Railway Express Agency under its present agreements with the airlines.

"Due to the method of handling express which, in the main, comprises comparatively small package shipments, and the necessity for relatively higher rates, the potential traffic available is not such under present circumstances as to warrant further competition."

No Mail Pay. In answer to arguments that the cargo lines will come back for mail pay, the CAB majority said, "We have made it abundantly clear . . . that in this present proceeding we find the public convenience and necessity *not* to require certification of the applicants for carriage of mail . . . The freight carriers which will be certificated herein will not receive support in the form of mail pay."



At Cargo Clinic— The Aviation Committee of the Oklahoma City Chamber of Commerce recently joined with major airlines in that area to hold its first air cargo clinic. One major purpose of the clinic was to show businessmen how they could expand their markets and solve shipping problems. Among those participating were, left to right: William H. Shockey, chairman, Aviation Committee, Oklahoma City Chamber of Commerce; John H. Smith, supervisor of cargo, Continental Air Lines; A. C. Hodges, regional superintendent, air mail service, Fort Worth, Tex.; Lou Person, manager of schedules and tariffs, Braniff Airways; Dal DeWeese, manager, air cargo sales, southwest division, American Airlines; Frank Moore, district supervisor, Mistletoe Express, Oklahoma City; C. O. Naucke, Railway Express Agency, Air Division, Houston; Warren Kraemer, Latin American Division, Braniff Airways.

The majority repeated its assertion, which had been attacked by the airlines, that there is an existing air freight potential of one billion ton-miles annually, but added that realization of it will require intensive development.

A billion ton-miles at present rates would produce revenue of $150,000,000 to $200,000,000, CAB said, adding that the airlines' passenger revenue last year was $346,000,000. "Certainly the presently certificated carriers have in their passenger traffic a type of carriage of such character and size as by itself should provide ample opportunity . . . for the development of profitable operations. There seems to be little logic in believing that a monopoly of air freight would make the bulk of their business—passenger carrying—profitable."

Attached to each cargo certificate was a clause permitting transportation of cargo attendants with live animal shipments. Earlier this year CAB had ordered Slick to remove "cargo attendant" rules from its tariffs on the grounds that an attendant was in effect a passenger, and could not be transported by an all-cargo carrier. Slick complied but asked for an official ruling on the point. The new clause resulted.

Purdue Flight Course Will Offer Transport Rating

With certification of Purdue Aeronautics Corp. to operate a scheduled air shuttle service between Lafayette, Ind. and Chicago, Purdue University will initiate a graduate course for the student with a BS degree in air transportation. Following his undergraduate work, the student will take two years of graduate work to qualify as a professional pilot.

This system, taking the undergraduate of flight training course with some 1,000 hours less flying time than required for scheduled pilot service, will provide an additional 1200 hours flight, training and certification with an airline transport rating plus A & E mechanics licenses. The processing will provide physical and psychological screening. During this two-year period the student will be employed on a half-time basis and have an opportunity to work on a master's degree in any field of his choice and qualification.

Arrangements have been completed to provide 400 hours of flight instruction to students in undergraduate flight courses, 200 hours of non-scheduled charter flight, 100 hours of twin engine transition and 200 hours of non-scheduled cargo flying during the two-year graduate work. Starting in mid September 300 hours of scheduled passenger flying will also be included.

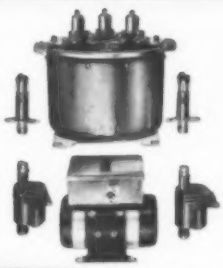
While work during the graduate phase of the training will be self-supporting with $100-$125 per month paid for service, the airlines will be asked to provide a minimum of six and a maximum of nine $3,000 scholarships annually to defray undergraduate fees in advanced flying during the students' junior and senior years.

The promise that pilots graduating from this course will be capable of service in a broader field of airline activities has stimulated interest on the part of some major airlines. Purdue expects to be able to supply about 9 pilots per year to the airlines. This is approximately 5% of the estimated annual needs of the airlines.

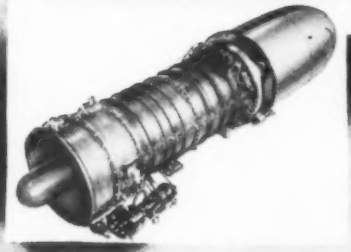
Plans are to carry passengers and property between Lafayette and Chicago in four-passenger Cessna 195's, making two round trips daily.

The certificate may terminate sooner than the three years allowed if Roscoe Turner Aeronautical Corp. commences authorized service on the route.

THE SPARK OF LIFE FOR JETS...



Bendix-Scintilla* Jet Ignition Systems are specified as original equipment on two of the leading makes of jet engines.



...AGAIN IT'S BENDIX-SCINTILLA!

The fact that Bendix-Scintilla Ignition Systems are used on some of the leading jet aircraft engines is noteworthy in two respects. It is powerful confirmation of their dependable, proven performance in all types of aircraft power plants, and it is a definite recognition of the vast experience, manufacturing facilities, and resources which form the Scintilla Magneto organization. We believe the past and present performance records of Bendix-Scintilla Ignition Systems warrant primary consideration by aircraft engine manufacturers in every category.

*TRADEMARK

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Bendix AVIATION CORPORATION

Great Strides Since War:

Air Transport in India Becoming Major Industry

By Ernest J. Silver

(Far Eastern Director, Air Carrier Service Corp., Washington, D. C.)

Few people in the American aviation industry realize the increasingly important position India is beginning to occupy in the world of air transport.

The air transport industry of a country that has seven major certificated airlines operating close to one hundred and fifty DC-3's plus a number of DC-4's, Constellations, Vikings and Doves is worth examination. Since India's birth as an independent nation, all industry in that country has started to move ahead with great strides, but no industry has done so more meteorically than Indian air transport.

At the end of the War India found herself supplied with a large quantity of surplus AAF material plus the following inducements to the development of air transport: a large country with many big and widely separated cities; a badly overburdened railroad system; and practically no roads. Plenty of interested capital was also available, and airlines began to spring up in India practically everywhere one looked. A number of these airlines have already collapsed completely and gone out of the picture; others have continued to develop and expand.

Regulation. The office of the Director General of Civil Aviation is the Indian equivalent to our CAA and CAB combined. The DGCA has complete jurisdiction in the granting of internal and foreign routes to Indian air carriers and in the setting up of maintenance and overhaul schedules and standards for the different Indian operators. The airlines themselves have so far had very little voice with the DGCA, and they have frequently been required to accept rather arbitrarily made regulations from DGCA bureaus that have had very little experience in understanding and assisting airlines.

A very pointed example of this is the Indian DGCA requirement that every single aircraft in India in order to have a Certificate of Airworthiness must have an annual major overhaul regardless of the number of hours the aircraft has flown during the year. This overhaul is called a "Certificate of Airworthiness Overhaul" or simply a "C of A" and is roughly equivalent to the eight thousand hour overhaul given to aircraft on our own airlines. With the facilities available in India it usually takes an airline from six to ten weeks to do a "C of A."

This, of course, does not permit good utilization of aircraft, and it is a very important factor in accounting for some of the great financial losses in Indian air transport. From a short term point of view a yearly "C of A" is all very good for exporters of spare parts from the United States, but it is not good for the Indian airlines which operate on a very small allotment of dollars each year.

Indian ATA. During the past few months an Indian Air Transport Association has been formed by the major Indian airlines. This association, which is somewhat along the lines of the ATA in the United States, will have various committees dealing with problems of traffic, operations, maintenance and governmental relations. Through it the airlines of India hope to have a consolidated voice with which they can persuade the DGCA to act more in the interests of the sound growth of Indian air carriers than it has in the past.

For the present at least the position of American aircraft and American aviation equipment in India is secure. This is in no way due to the efforts of our manufacturers but simply because there are no other suitable products available. Unfortunately there have been a number of rather unscrupulous concerns and individuals from the USA who, realizing the opportunities created by the great and rapid expansion of Indian airlines, have taken one or two of the Indian airlines "for a ride." Such incidents have made a very serious impression in India, and they effect all American companies trying to do business there. It might be added that these unscrupulous actions have yet to be lived down.

Market for U. S. Although some of the Indian companies (notably Air India and Indian National) have purchased Vikings, it is generally believed that future aircraft purchases will be made in the USA providing, of course, that the government of India will allow the necessary dollar expenditure. Such expenditures in the near future, however, appear to be highly unlikely owing to India's critical dollar position. Nevertheless there is hardly an airline in India that is not looking ahead to the day when it can replace the DC-3.

At present the DC-3 in India is not allowed to prove its full value as it started operations with a number of handicaps, among which are the following: Pratt and Whitney engines are allowed to run only 750 hours before overhaul; the yearly C of A which is required makes high utilization impossible; gross weight is restricted (although this has recently been increased to 25,700 lbs.); passenger accommodations and facilities on DC-3's converted in India are well below regular airline standard DC-3's in the USA.

In connection with this last point it is interesting to note that the DGCA will not authorize smoking in any DC-3. The ostensible reason given for this is that non-fireproof materials were used in the conversions done in India. Despite this assertion, the ban on smoking applies even on aircraft converted in the USA with fire resistant materials used in the "plushing."

Many of the Indian operators feel that this ban is just a carry-over from the days when the DGCA was not controlled by Indians, and it was desired to present American aircraft in none too favorable a light with the general flying public of India. If these various handicaps in the operation of DC-3's can be rectified, many of the Indian airlines appear to be willing to fly DC-3's as long as they can be flown.

Lacked Experience. Many of the Indian airlines seemed to have started operation with little or no understanding of the business of air transportation. As a result three airlines have already gone out of business, and of the remaining seven at least two more are predicted to collapse. It seems that there has been a good deal more capital than good business judgment available.

A number of the Indian concerns still seem to cherish the illusion that all that is necessary to operate an airline is good aircraft and competent technical personnel. Problems relating to traffic

30 Years for IATA— On the recent 30th anniversary of the International Air Transport Association, Sir William P. Hildred, present IATA director-general, was recipient of the desk which the late Sir Sefton Brancker, Britain's first director-general of civil aviation and the founder of IATA, was using in 1919 when he signed the document bringing the association into existence. Picture of the late Sir Sefton, who was killed in the R101 airship disaster, is shown in the photograph above Sir Williams.

and general administration of a transport system seem to have been overlooked. One thing must be said, however, and that is that the lines which are still in business are learning, and learning fast!

Following is a very brief summary of the more important certificated Indian air carriers:

Air India operates a trans-India service as well as a member of other services radiating out of Bombay to points in India, Pakistan and Ceylon. Vickers "Viking" aircraft and DC-3's are used on these services. Air India's affiliate, Air India International, is fifty-one percent owned by the Government of India and forty-nine percent by Air India. The management of the international company is provided by Air India. Air India International is at present flying Constellations between Bombay and London.

Bharat Airways operates its services out of Calcutta to Dehli (via two different routes) and to points in East Pakistan. These routes are operated with DC-3's. Bharat has just started an international service using DC-4's between Calcutta, Bangkok, Saigon, Hong Kong, Shanghai and Tokyo. This line is also seeking permission to fly an express service between Calcutta and Karachi and has evinced a very definite interest in extending its domestic route through to Bombay.

Deccan Airways operates a number of routes out of Hyderabad using DC-3 aircraft. Deccan is in the fortunate position of having some of the best routes in India with the least competition. The principal services of this company are up and down the center of India serving the cities of the Deccan Plateau with extensions to both coasts of India. Deccan has applied for permission to operate DC-4's over certain segments of their routes. Deccan Airways has earned the reputation for outstanding efficiency in Indian airline operation.

Airways (India) Ltd. operates DC-3's out of Calcutta to various points in the northeast and on its main line along the Caromandel Coast and in to Bangalore. AIL is one of India's smaller airlines, but they have the reputation of being a well-run operation.

Air Services of India makes its headquarters in Bombay and flies between there and Karachi and New Delhi as well as other numerous local services. ASI flies DC-3's only.

Indian National Airways is India's oldest airline, and for a while it was practically the "training school of Indian Airlines." Ex-INA personnel are now to be found with almost every other Indian airline. INA has its main base of operation in Delhi and operates DC-3's and "Vikings." The principal routes of INA cover northern India with an extension to Karachi and another from Calcutta to Rangoon. INA is presently reported to be having serious financial and managerial difficulties.

Indian Overseas Airlines operates DC-3's on routes across India between Bombay and Calcutta as well as various other internal routes. IOA has been certificated to fly between India and Australia via Rangoon, Bangkok, Singapore and Batavia. One survey flight has been made on this route with a DC-4, and according to recent reports this projected service has been abandoned for the present.

IOA is noteworthy as being the first Indian airline to operate the "night mail" service. At present the DGCA will not authorize carriage of passengers at night on a common carrier basis. The "night mail" scheme is really an experiment to pave the way for scheduled passenger night flying in India.

According to latest reports Indian Overseas is at present under severe financial strain, and many observers in the Indian aviation industry feel recovery will be impossible.

In addition to the certificated airlines India, too, has its "non-skeds." The two biggest companies in this field are Himalayan Aviation Ltd. and Kalinga Air Lines, both operating out of Calcutta with C-47 cargo-type aircraft. Both companies are doing a thriving business hauling cargo such as textiles and tea between Calcutta and various points in Assam. The creation of East Pakistan has cut the State of Bengal into two parts—West Bengal, in which is located Calcutta, belonging to India and East Bengal belonging to Pakistan. The creation of an international frontier in the middle of what formerly was one state has also created numerous obstacles in the way of railroad freight.

As matters stand today it is far cheaper to ship almost any sort of cargo by air from Calcutta to Assam and not touch Pakistan territory than it is to ship by rail and run the risks of pilferage, customs delays and the expense of duties. Despite the fact that both Himalayan and Kalinga get a daily utilization of over eight hours on their aircraft, they still cannot haul all that is offered. In addition to the charter companies, many of the scheduled airlines run special charters every day from Calcutta into Assam or into East Pakistan itself.

Seagoing 'Copter—This amphibious helicopter, the Air Force's first, is a Sikorsky H-5H equipped for air-sea rescue, search, and liaison. The model shown can carry three litter patients and has a hydraulic winch to haul survivors into the cabin while hovering.

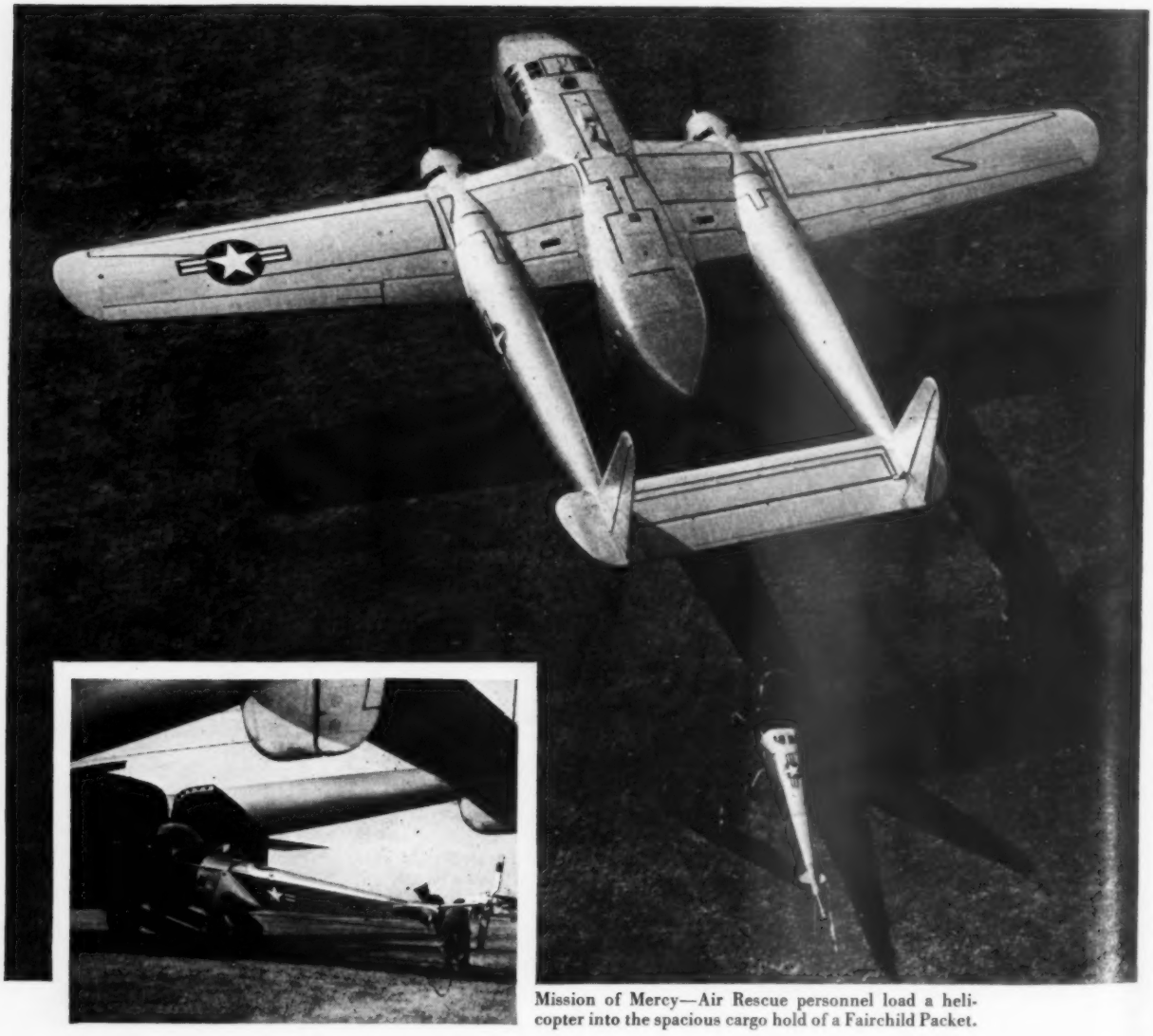
Qualified Personnel. Although the pool of trained Indian technical personnel has not been of sufficient size to cope with the tremendous growth of India air transport, India does have a sizeable group of its own nationals who are highly qualified aviation technicians. The same can be said for the situation as regards airline pilots in India. The Royal Indian Air Force has been an important source for pilots. Foreign visitors to Indian airlines are apt to be a little surprised to see that there are so many highly experienced Indian personnel both in air and ground operations. These men deserve a lot of credit for the way they have been running their air transport system. Not only does India today deserve note for the size of its air transport industry, but even more so for the quality of it.

Overhaul. Some mention should be made of Hindustan Aircraft Ltd. in Bangalore in order to have a more complete view of Indian Aviation. Hindustan is a government-owned manufacturing and overhaul center employing about six thousand persons. With the exception of two or three airlines who are capable of handling all their own overhaul work, all Indian airlines are dependent on Hindustan for engine overhauls and some airframe C of A overhauls. As presently set-up HAL is overhauling R1830-92 engines, Bristol Hercules engines, propellers and all accessories as well as DC-3 aircraft.

Hindustan is also doing a great deal of overhaul work for the RIAF including C-47's, Hawker fighters, Doves, and they are now in the midst of a B-24 reconditioning and overhaul program. In addition to this overhaul work Hindustan recently turned out the first Percival "Prentice" military trainer to

AIR RESCUE

Over faraway jungles, deserts and mountains, helicopters of the USAF Air Rescue Service have flown in search of stranded airmen and passengers. The helicopters got there because they have been given a "mother" ship—the Fairchild Packet—that transports them over distances far beyond their range. Thus, our Air Force has added a new ability to the versatile Fairchild Packet—increasing the importance of its part in the development of modern airborne military tactics.



Mission of Mercy—Air Rescue personnel load a helicopter into the spacious cargo hold of a Fairchild Packet.

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Al-Fin, Farmingdale, N. Y. • Subsidiaries: Stratos Corporation, Farmingdale, N. Y. • Duramold Aircraft Corporation, New York 20, N. Y.

be built in India. These aircraft are being manufactured under license for the RIAF. The factory is also at work on the first "all-Indian" aircraft—the HT10, a low wing military trainer designed by the Hindustan engineering department and being built for RIAF.

As more and more Indian airlines are able to meet their own requirements in major engine and airframe overhaul work, Hindustan Aircraft is beginning slowly to turn to manufacturing equipment—primarily for the RIAF. Because of the fact that Hindustan is a government-owned company many of the airlines feel that their work is always apt to receive second priority to RIAF and other government-operated aircraft, and this results in great time delays.

Another often heard complaint is that costs are unreasonably high. The airlines tend to feel that with overhaul departments of their own they can control overhead expenses, procurement expenses, time required for work, and integrate overhaul work into their own organizations' accounting systems far more efficiently than by working with an entirely separate, unflexible government-owned company.

Parts and Supplies. One serious problem that faces all of the Indian airlines is maintaining a supply of parts and aviation supplies to keep their sizeable fleets in the air. As long as American-made aircraft are used, a large quantity of replacements must be continually imported from the United States by the airlines. It is an extremely difficult job for an airline to secure the necessary import permits and subsequent authorization for dollar exchange.

To make things even more difficult, a part of the little foreign exchange that is available for aviation imports is from time to time allocated to local import-export companies or aviation equipment brokers. The airlines then are required to buy their equipment from local stockers and suppliers at prices that are far greater than those for which they could procure items through their direct representatives or agents in the USA.

Lately there has been a tendency for Indian airlines to ask for their own import licenses and foreign exchange allotments so that they would not have to work through local importers or manufacturers agents exclusively. Experience has shown the airlines that savings of well over 30% can be expected in their supply budget if they do their own direct importing.

The Indian air transport industry has made remarkable strides since the War. It is now meeting and trying to solve a number of problems which are very similar to those facing our own air transport industry.

The ways which the Government of India, the Indian airlines and others concerned with aviation in India devise to try to solve these problems will have a very direct effect on the American aviation industry. Air transport in India will be worth watching.

Modified Flying Wing—A modification program currently in progress at Northrop Aircraft, Inc. has for its objective an all-wing bomber type aircraft capable of operating at extremely high altitudes. Plans call for conversion of the present Flying Wing to be powered by six jet power plants instead of the present piston engines. This artist's conception shows that four of the jets will be housed in the wing while the other two will be suspended in streamlined pods.

Alaska Airlines Cited For Violations

Alaska Airlines' non-scheduled air carrier operating certificate was suspended by CAB on Aug. 4, in a decision that also prohibited, for a limited period, all scheduled flights of the carrier, except those conducted under daytime visual flight rules. The actions were taken following a CAA complaint that the company had violated numerous regulations.

The CAB decision noted that the CAA Administrator has "agreed to consider the acceptance of $20,000 in compromise of civil penalties arising out of the violations charged in the complaint."

The non-sked certificate suspension, effective Aug. 8, continues in effect until Alaska passes re-examination by CAA of its qualifications to hold such certificate. The scheduled operating certificate, except for day VFR, was suspended for seven days from Aug 8 "and unless during said period . . . the respondent shall pass successfully a re-examination by the Administration as to its qualifications to hold said certificate, then the suspension . . . shall continue in effect until further order of the Board."

Alaska must complete with 30 days all revisions required by CAA in operating policies and procedures and in its manuals "as may be required to assure that violations . . . will not be repeated."

CAA's Complaint. The CAA complaint alleged that from May 1, 1947, to June 27, 1949, Alaska operated as an air carrier between Alaska and foreign countries other than Canada, and between the U. S. and foreign countries, other than Canada, "without an air carrier operating certificate authorizing such operations." CAA alleged further that the company, under its non-scheduled certificate, operated certain engines in excess of maximum period of 700 hours since last overhaul authorized by the certificate.

Alaska also was charged during part of 1948-49 with failing to provide an adequate number of check pilots to insure that each first pilot met route competency requirements of its scheduled certificate. It was said that Alaska had used pilots in excess of flight time limitations.

On a Jan. 20, 1949 Naknek-Homer-Anchorage flight, CAA said, the pilot had not been qualified on the route by a check pilot, weather reports used were an hour and a half old, the flight operated part of the way VFR when it should have been IFR, and it was at an altitude less than 1,000 ft. above the highest obstacle located within a horizontal distance of five miles from the center of the course intended to be flown. This flight crashed near Homer, killing five persons.

Injunction Violated. Reports from Alaska indicated that Judge Anthony Dimond of District Court for the Territory on Aug. 4 fined Alaska Airlines $14,000 and James A. Wooten, its president, $1,000 for contempt of the injunction obtained last November by Pacific Northern Airlines, Northwest Airlines, Pan American Airways, and the CAB.

The injunction required Alaska to refrain from operating more than occasional and infrequent flights other than on its certificated routes in Alaska. CAB filed the complaint for contempt against Alaska and Wooten, charging that the airline had violated the injunction by operating regular and frequent service between Alaska and the U. S., particularly Seattle. Alaska and Wooten entered pleas of nolo contendere. Judge Dimond also imposed a suspended fine of $25,000 upon the company, conditioned upon further obedience to the injunction. Wooten's $1,000 fine is payable immediately, but the company arranged with the judge for time extension until Nov. 1 to pay its $14,000.

Lockheed Penetration Fighter...

range, speed and durability

This is the F-90, a Jet Penetration Fighter, built for the U. S. Air Force by the Lockheed Aircraft Corp. It is designed to fly long ranges at high speeds. It can *penetrate* deep behind enemy lines to win and maintain air superiority and to destroy ground installations.

The F-90 is a big airplane for a big job. It is a rugged fighter, capable of inflicting heavy damage and taking a lot of punishment. And it is a two-fisted fighter—two jet engines, duplicate controls and two sets of everything else vital to an airplane's operation. It could suffer direct hits knocking out either engine or set of controls and still return to its base.

The F-90 is a versatile airplane, able to perform many jobs besides penetration fighting. It can be adapted as an ideal photo reconnaissance plane. Camera equipment can be serviced or replaced in a matter of minutes. Another simple modification and the F-90 is an excellent intercepter with outstanding climb, maneuverability and fire power. This quality of being many models in one spells additional Air Force economy and efficiency.

Lockheed

LOOK TO LOCKHEED FOR LEADERSHIP

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Slight Drop from '47:

70% N. Atlantic Traffic Via U. S. Carriers in 1948

While losing a little ground to their five foreign competitors, as compared to the previous year, the three U. S.-flag airlines flying the North Atlantic carried more passengers than ever before in 1948 and transported nearly 70% of the total number of passengers crossing in both directions.

Such were the facts shown in the latest study of air traffic in and out of New York City made by the analyses division of the Civil Aeronautics Board's Economic Bureau. They could hardly be called discouraging, especially in view of the fact that four of the five foreign airlines increased their North Atlantic schedules appreciably last year, while two of the American carriers—Pan American Airways and American Overseas Airlines—actually reduced schedules in what was a peak travel year.

Of the 211,139 trans-Atlantic air passengers last year, 145,994—or 69.15%—traveled via the three U. S. lines, while 65,145, or 30.85% flew with the five foreign-flag lines—Air France, British Overseas Airways, KLM Royal Dutch Airlines, Sabena Belgian Airlines and Scandinavian Airlines System.

The year before, in 1947, the U. S. lines had carried 141,703 passengers, or 73% of the 194,113 flown by all eight carriers operating between New York and Europe. There was one important difference, though. The 6,026 trans-Atlantic trips flown by the U. S. carriers in 1948 represented 68.76% of the total trips operated, whereas the 5,644 U. S.-flag flights in 1947 had represented 72.63% of the year's total.

More Trips, More Traffic. There apparently was some relationship between schedule frequency and the percent of traffic carried. Trans World Airline, for example, upped its trans-Atlantic trips from 1,323 in 1947 to 1,913 last year and raised the percentage of total passengers flown on its planes from 17.85% in 1947 to 21.33% last year.

Conversely, Pan American operated 29.08% of the total schedules and carried 30.80% of the passenger total in 1947, and dropped to 24.80% of the passenger volume last year when it reduced schedules and operated only 24.98% of the total.

TWA had 45,030 trans-Atlantic passengers last year, as against 34,647 the year before, while PAA's volume dropped from 59,780 to 52,369. Air France, which increased its flights from 397 to 727 saw its passenger volumes go up from 10,562 or 5.44% of the total in 1947 to 16,633 or 7.88% of the total in 1948. And BOAC, the only foreign carrier to reduce schedules to and from New York last year, was also the only one of the five to carry fewer passengers last year than in 1947.

Average load per plane on the Atlantic route last year was 24.2 passengers, as compared to 25.1 passengers per plane in 1947. BOAC and SAS, with 25.4 and 26.7, respectively, had the best load averages for last year.

With travel restrictions abroad becoming less stringent, U. S. citizens flew to Europe in record numbers last year, topping alien air travelers for the first time since the war. Of the total trans-Atlantic passengers carried out of and into New York last year, 114,194 or 54.1% were U. S. citizens and 96,945 or 45.6% were aliens. In 1947, alien travelers had numbered 105,609 and U. S. citizens 88,504.

PAA Suspends: Pan American Airways has suspended all flights into and out of Gautemala until further notice because of political turmoil in that country.

Trans-Atlantic Traffic—1947-1948

(U. S. and Foreign Scheduled Air Carriers)

Carrier	No. of Trips		% Total Trips		No. Passengers Carried		% Passengers Carried	
	1948	1947	1948	1947	1948	1947	1948	1947
AOA	1,923	2,061	21.94	26.52	48,595	47,276	23.02	24.35
Pan American	2,190	2,260	24.98	29.08	52,369	59,780	24.80	30.80
TWA	1,913	1,323	21.84	17.03	45,030	34,647	21.33	17.85
All U. S. Carriers	6,026	5,644	68.76	72.63	145,994	141,703	69.15	73.00
Air France	727	397	8.30	5.11	16,633	10,562	7.88	5.44
BOAC (Br.)	487	526	5.56	6.77	12,762	13,335	6.04	6.87
KLM (Dutch)	687	462	7.84	5.94	14,650	11,772	6.94	6.06
SABENA (Belg.)	214	139	2.44	1.79	4,446	3,336	2.10	1.72
SAS (Scand.)	623	603	7.10	7.76	16,654	13,405	7.89	6.91
All Foreign Carriers	2,738	2,127	31.24	27.37	65,145	52,410	30.85	27.00
Grand Total U. S. and Foreign Carriers	8,764	7,771	....	....	211,139	194,113	....	....

CAB Briefs

(Route, Mail Rate and Other Actions of Civil Aeronautics Board)

Route Cases

American Airlines' exemption request to permit immediate non-stop operations between New York and Toronto has been denied by CAB. American had sought an interim authority pending CAB action on certificate amendment applications of both AA and Colonial Airlines.

Canadian Pacific Air Lines, Ltd. has applied for a foreign air carrier permit to operate between Vancouver, B. C. and Sydney, Australia, via San Francisco, Honolulu, Canton Is., and Fiji Is. The carrier was designated by Canada to operate the route under terms of the new U. S.-Canadian air transport agreement.

Through a number of amendments to **Capital Airlines'** certificates, the CAB recently made possible generally improved flexibility in the airline's service to points in northern Michigan. The following changes were made:

Saginaw-Bay City was named a Route 14 intermediate stop between Flint and Lansing. Seasonal restrictions on operations between Traverse City and Grand Rapids were eliminated. Chicago and Milwaukee were designated as Route 41 terminals beyond Muskegon. Non-stops were authorized between Chicago and Lansing and between Chicago and Saginaw-Bay City.

Permanent authorization to provide mail service to Flint, previously served by exemption, was granted. Lansing was made an intermediate on Route 41 between Grand Rapids and Saginaw-Bay City. And Muskegon was made an intermediate on Route 41 between Grand Rapids and Chicago and between Grand Rapids and Milwaukee.

Trans-Texas Airways has been authorized by an exemption to serve Beeville as an intermediate point on segment 3 of route 82 until final decision on the company's application for certification of Beeville. Beeville is to receive mail, passenger and property service as a stop between San Antonio and Victoria, Tex.

Interchange Agreements

CAB has ordered consolidation of the proposed **National-Panagra-Pan-American** stock sale and interchange agreement with **National Airline Dismemberment Case.** At the same time the board denied the motions of Chicago and Southern, Panagra, and Pan-American to dismiss the Dismemberment proceeding, and denied motions of Braniff, Delta, and Eastern and Pan American to consolidate New York-Latin American route applications of the four with NAL Panagra PAA interchange dockets. Also made part of the Dismemberment proceeding is the proposed National-Eastern interchange agreement.

The Board disapproved expansion of the **Delta-TWA** interchange agreement to allow through-plane service between TWA points north of Cincinnati and Delta points west of Atlanta, holding that possible diversion from **Chicago and Southerns** Detroit-New Orleans operation outweighed possible benefits from the proposed interchange. Denial means that DAL schedules between Atlanta and New Orleans and the Detriot-Atlanta interchange schedules must bear separate flight numbers and Detroit-New Orleans service may not be advertised as through service.

Corporate Actions

Acquisition of control of **Central Airlines, Inc.,** certificated feederline, by three directors of Keith Kahle Aviation, Inc., and resulting interlocking relationships, have been approved by the Board subject to six conditions designed to prevent the creation of a monopoly.

An agreement has been filed asking CAB approval for merger or consolidation of **Monarch Air Lines** and **Arizona Airways,** with the former acquiring all the issued and outstanding stock of the latter. Arizona Airways has not been able to implement its three-year feeder certificate authorizing local air service in an area bounded by Yuma, Winslow, El Paso and Douglas. The certificate is due to expire June 29, 1951.

Mail Rate

Mail rate established for **Southern Airways'** Route 98 is estimated to provide an annual yield of $1,047,000 at a 90% performance factor and at 5,328 base miles. Rate decreases by time periods, with the current base rate of 60c are applicable from June 10 through Nov. 30.

Free Transportation

Request of **Trans-Pacific Airlines, Ltd.,** to provide free transportation to members of the press and "persons prominent in public life" between points in the Hawaiian Islands has been denied by CAB.

Free transportation of technical employes of various companies associated in the development of the Boeing 377 Stratocruiser has been allowed on **Northwest Airlines'** request covering flights to observe the plane's performance.

Airline Profits

Greatly improved airline earnings this year as compared with last are shown in first reports announced by domestic carriers for first half operations.

Six airlines have reported aggregate net profits of $6,278,031 for January-June, compared with net loss of $3,037,040 for same 1948 period.

Jan.-June Net Profit or Loss	1949	1948
American	$3,563,000	—$4,098,000
Capital	92,035	—575,766
C & S	296,621	267,682
Eastern	2,148,361	1,321,065
MCA	148,400	32,171
Pioneer	56,614	15,808
Totals	**$6,278,031**	**—$3,037,040**

PO Asks Recapture Of Panagra Mail Pay

The Post Office Dept. has demanded the return of $2,000,000 of "excessive" mail pay which Pan American-Grace Airways was awarded by CAB for the period 1939-42 and has been permitted to retain. In a brief filed with CAB in the Panagra Mail Rate Case, PO contended that the carrier's proposed new rates are excessive and provide an abnormally high return on Investment.

"The original decision of the Board permitting the carrier to retain these earnings without provision for their ultimate return has been demonstrated to be in error," the PO declared. "The carrier was originally permitted to retain excess earnings not because entitled to them, but because of a possible future emergency requiring additional mail pay more quickly than it could be obtained by application to the Board. Thus, the overpayment of $2,000,000 was retained by the carrier as an advance of unearned future payments."

PO demanded that the money be returned by offset against future mail payments, or otherwise.

Akron Airport Ready For Lightplanes at Races

Offering several items that will be in short supply at Cleveland during the National Air Races, Sept. 3, 4, and 5, namely parking space for personal planes and hotel rooms, the City of Akron, O., and Akron Airport bid to be host to many private plane owners over that weekend.

The Akron Airport has announced that it has ample facilities for parking and servicing all types of planes and that there is city bus service from there to downtown Akron.

The Akron Convention Bureau will arrange for tickets to the races and hotel rooms on request, and guarantees charter bus service to the races for $2.00 a person per round-trip.

Helicopter Records

The international speed records and altitude records for helicopters set by the Sikorsky S-52-1 during April and May have been accepted as official by the Federation Aeronautique Internationale. The records are:

Maximum speed over a three kilometer course: 129.552 mph, set by Harold E. Thompson, Sikorsky pilot, at Cleveland, O., April 27. This exceeds a year old British record of 124.315 mph.

Speed for 100 kilometers in a closed circuit: 122.749 mph, set by Harold E. Thompson at Milford, Conn., May 6.

Altitude: 21,200 ft., set by Capt. Hubert D. Gaddis at Bridgeport, Conn., May 21.

FAI's confirmation of these records gives the U. S. a clean sweep of all official world helicopter records. Others, also held by Sikorsky helicopters, are for duration and distance in a closed circuit, airline distance, and speed over a 1,000 kilometer closed circuit.

Another organizational change in-

CAB CALENDAR

Aug. 29—(Docket 3702). Hearing in CAB investigation of joint fares of American, Continental, Inland, Mid-Continent, TWA, United, and Western. Tentative. Examiner R. Vernon Radcliffe.

Aug. 29—(Docket 3964). Hearing in Trans-Canada Air Lines Montreal-New York Foreign Carrier Permit Case. 10 a.m., Conference Room A, Departmental Auditorium, Washington, D. C. Examiner F. Merritt Ruhlen.

Sept. 6—(Docket 3623). Hearing (resumed) in S.S.W., Inc., Service to Lake Tahoe Case. 10 a.m., e.d.s.t. Room 2015, Temporary Bldg. 5. Examiner Barron Fredericks. Postponed from July 6.

Sept. 12—(Docket 3762). Hearing in CAB investigation of Hawaiian Common Fares. Tentative. Examiner Walter Bryan.

Sept. 12—(Docket 3350). Hearing in IATA Agency Resolutions Case. 10 a.m., e.d.s.t., Conference Room "A" Departmental Auditorium. Examiner Herbert K. Bryan. Postponed from July 18.

Sept. 19—(Docket 3748). Hearing on proposed change of airports by American Airlines at Springfield, Mass. Tentative. Examiner Walter W. Bryan.

Sept. 19—(Docket 2719 et al.). Hearing in Air Freight Tariff Agreement Case. Tentative. Examiner Herbert K. Bryan.

Sept. 26—(Docket 4965 et al.). Hearing in Parks Investigation Case. Tentative. Examiner Ralph L. Wiser.

Sept. 26—(Docket 3977). Hearing on proposed merger of Monarch Air Lines and Arizona Airways. Tentative. Examiner James Keith.

Aviation Calendar

Aug. 23-26—American Institute of Electrical Engineers, Pacific general meeting at Fairmont Hotel, San Francisco, Calif.

Aug. 25-28—National Flying Farmers convention, Ft. Collins, Colo.

Aug. 26-29—Airlines Medical Directors Association 7th annual meeting, Hotel Statler, New York.

Aug. 29-Sept. 1—Aero Medical Association 20th annual meeting, Statler Hotel, N. Y.

Sept. 3-5—National Air Races, Cleveland, Ohio.

Sept. 6-8—Annual spark plug and ignition conference sponsored by Champion, Hotel Secor, Toledo, Ohio.

Sept. 9-12—Instrument Society of America maintenance clinic, Statler Hotel, St. Louis.

Sept. 12—1st semi-annual meeting, CAA Airports Advisory Committee, Washington, D. C.

Sept. 12-16—Instrument Society of America convention, St. Louis.

Sept. 18-20—International Northwest Aviation Council annual convention, Spokane, Wash.

Sept. 20-22—Annual inspection, NACA Lewis Flight Propulsion Laboratory, Cleveland, Ohio.

International

Aug. 26-Sept. 10—Canadian National Exhibition aircraft show, Toronto.

Sept. 1-7—Federation Aeronautique Internationale annual meeting, Wade-Park Manor, Cleveland, Ohio.

Sept. 6—ICAO Council, 8th session, Montreal.

Sept. 7-9—Tenth Flying Display and Exhibition, Society of British Aircraft Constructors, Farnborough, England.

Sept. 8—IATA Executive Committee, The Hague.

Sept. 10—IATA OPS European, place undetermined.

Sept. 12-16—IATA fifth Annual General Meeting, The Hague.

Sept. 17—IATA Executive Committee, The Hague.

HERE'S WHAT GOES ON AT Airwork

ENGINE DIVISION. As an authorized Pratt & Whitney overhaul base performing engine overhaul service to leading airlines on a contract basis, we have exceptional production-line repair and overhaul facilities. The economies of operation resultant from this, as well as the high quality of workmanship, are available for executive type aircraft.

ACCESSORY DIVISION. As authorized service representatives for leading aviation manufacturers, as well as contractors to the U. S. Navy, we can accord top quality craftsmanship, from "Cub to Clipper". Our organization is built around the exacting standards of factory trained personnel.

DISTRIBUTOR DIVISION. We can, because of an exceptionally large inventory, assure immediate delivery, over a wide geographical area, on such products as Bendix, Champion, Jack and Heintz, Pratt & Whitney, U. S. Rubber, Titeflex, BG, Packard cable, etc. Additionally, we maintain a large staff of sales engineers who, through working with airlines, are well-qualified to advise on engine modifications, parts interchangeability and power plant problems.

One of four distributors of Pratt & Whitney

Airwork CORPORATION MILLVILLE, NEW JERSEY

because of the fact that Van Zandt just listed all the rumors he had heard,

Production Spotlight

Between the Lines

By James J. Haggerty, Jr.

More Unification

Congress has finally completed action on the bill to further unify the military services by expanding the powers of the Secretary of Defense. After considerable discussion, the House last week passed the bill by a vote of 356-7, and since it had previously passed the Senate, it was forwarded to the President for signature.

Although the general impression seems to be that the bill makes Defense Secretary Louis Johnson a military dictator, actually it is nothing more than a harmless modification of the original Unification Law, the objectionable portions having been written out in committee hearings.

Probably the most important provision of the bill is the clause which gives the Defense Secretary "direction, authority and control over the Department of Defense." This should result in a tighter top level organization. Where the three service secretaries were permitted to run their departments pretty much as they saw fit before, they will now become little more than funnels through which the Defense Secretary's orders will pass.

With a good man and good advisors at the top, this could be the answer to ending the petty bickering among the services. But with a single-minded defense chief and poor advice it could result in an unbalanced military establishment. While Secretary Johnson has not exactly exhibited the wisdom of Solomon in his first few months as defense boss, it would be wise to wait and see how he uses his new powers before hurrahing or condemning this provision of the bill.

Recourse to Congress. We have said before, and we still think, that a hard-headed man at the defense helm who indulges in hasty, one-sided decisions from which there is no appeal could be a dangerous thing for the nation's defense forces. The lawmakers, apparently cognizant of this, provided against that contingency by inserting a clause to the effect that any of the service secretaries (Army, Navy, Air Force) can take a grievance direct to Congress provided they first notify the Defense Secretary.

This does not mean that they can go running to Congress every time the defense chief slaps their wrists. But where a service is overruled by the Defense Secretary on a matter of strategy and tactics which might seriously affect the nation's defense, the service secretary can present his case to Congress and let the solons, and the public, decide the issue. An example of this would be the Johnson cancellation of the supercarrier *United States*.

The bill also provides for a single comptroller in charge of the purse strings of all three services and a new accounting system based on Hoover Commission recommendations. Johnson has stated that this, plus his additional powers of "direction, authority and control" which will enable him to eliminate wastage and duplication, will effect savings of $1,000,000,000 a year by July 1, 1950. Just how this tremendous saving will be accomplished, however, is a little vague.

To implement the greater administrative control that the Office of the Secretary of Defense will have under the new law, Congress created the posts of Deputy Secretary of Defense and three Assistant Secretaries of Defense. Steve Early, now Undersecretary of Defense, will be the Deputy Secretary. At present writing there has been no announcement of the names of the Assistant Secretaries.

The Pentagon gossips are guessing, however, that Marx Leva and Wilfred J. McNeil will get two of the three posts. Leva is now Johnson's general counsel and McNeil his budget expert; both have titles of special assistant to the secretary. A number of names have been mentioned for the third slot; the one most often repeated is that of Paul Griffith, former national commander of the American Legion and also an assistant to the secretary.

Another organizational change included in the bill is the provision for the position of a permanent chairman of the Joint Chiefs of Staff, the post now held on a temporary basis by Gen. Eisenhower. The language of the bill will permit the appointment of either a civilian or a military man, but since there are few civilians with enough experience to handle a job of this importance, it will probably go to a general. Most prominently mentioned is Army Chief of Staff Gen. Omar N. Bradley.

Point for Navy. Although these are the most important provisions of the bill from the standpoint of national defense, there is one more important to Navy supporters who lobbied like mad for its inclusion. This is the clause which prevents the Defense Secretary from transferring, reassigning, abolishing or consolidating any of the combat functions of the Army, Navy or Air Force. That's mighty important to the boys in blue and their Marine brethren, for it means that Johnson, or his successor, cannot shift the Marine Corps to the Army or Naval aviation to the Air Force without Congressional approval. And despite Johnson's repeated statements that he never had any such intention, the Navy is convinced that there were such plans in the making.

Plane Investigation

As we go to press the House investigation of military procurement and strategy, involving the purchases and use of the Convair B-36 bomber, is just about to get under way and indications are that it won't drag on as long as everyone thought. The whispers in the Pentagon are that the Air Force will come through smiling.

Ever since Rep. James E. Van Zandt (R., Pa.) first aired the rumors about the B-36 on the House floor and demanded an investigation, the Air Force has been busy preparing a very pat presentation answering in detail each of Van Zandt's charges.

This job was simplified somewhat

Convair Flying Boat— This is the Navy's streamlined flying boat, the Convair XP5Y-1, now nearing completion at Convair's San Diego, Calif., plant. Grossing more than 60 tons, the XP5Y-1 will be powered by four Allison turbo-prop engines. The Navy has ordered two of the boats, the first of which will be ready for flight testing this fall.

because of the fact that Van Zandt just listed all the rumors he had heard, apparently without checking beforehand to see what degree of truth each contained. For instance, linking Defense Secretary Louis Johnson's name with B-36 procurement because he had been a director of Convair appears to us to be a mistake, since the Air Force can disprove the allegations by simple chronology—showing that the decision to revive the B-36 program was made before Johnson was even approached with the offer to take his present post, although official announcement of the decision was delayed until after he had been sworn in.

Also, the charge that W. Stuart Symington, Secretary of the Air Force, had frequently visited the desert ranch of Floyd Odlum, Convair board chairman is a weak one; Symington can prove that his visits were very infrequent and purely social, made at some times when Odlum was not even there. These easily-disproven charges will probably be answered first, weakening Van Zandt's case, for the other rumors he aired, some of which might contain a degree of truth, will then seem weak by association.

Ace in the Hole. The clincher, though, our informers tell us, will be the release of new performance information on the B-36, possibly announcement of successful completion of a 10,000-mile mission with a 10,000-pound bomb load. If, in the months since the charges against the plane were first aired, the Air Force has not flown such a mission, we have been guilty of error in holding such a high opinion of the ability of Symington's public relations advisors. For there is little doubt that the plane can fly such a mission at low altitudes—it has already flown a 9600-mile mission with sufficient fuel left on landing to fly the other 400 miles.

Whether it could fly such a mission under combat conditions, at top gross weight, with turrets popped and ready for action (creating additional drag), at altitudes above 40,000 ft. for twelve hours or more (to simulate the time which would be spent over enemy territory on an actual mission)—well, that's another question.

But such an announcement would undoubtedly have a very salutory effect on the Air Force's chances of coming through the investigation with a clean face. Without a very careful analysis, it would appear to both the public and the investigators, neither of whom have the technical background to assay such announcements, that the plane had answered its critics.

And once having made that point, it seems to us that the Air Force could coast through the rest of the investigation, since there could no longer be any question of the legitimacy of its procurement nor the efficacy of its strategy in making the big bomber the mainstay of our retaliation force.

Production Spotlight

Higher Wages, Fewer Planes: There is now a chance that the military services will be able to buy even fewer aircraft during the coming fiscal year than the already too low number which the administration favors, due to the possibility that the minimum wage for unskilled labor in the aircraft industry may be raised from its present level of 80-95c per hour to a new high of $1.15. This latter figure is the rate proposed by two aircraft unions—the International Association of Mechanists and the United Automobile Workers, CIO—in wage revision hearings held recently by the Wage-Hour Division of the Department of Labor.

At the hearings, the **Aircraft Industries Association** opposed the $1.15 rate and urged that no new determination of the minimum wage scale be made at this time. Although approval of the proposed minimum wage by the Secretary of Labor would not fix minimum rates for other classes of aircraft workers, manufacturers claim that it would, in effect, serve as a lever for a general wage increase throughout the industry, since it would be necessary to raise the wages of skilled workers proportionately in order to maintain the present ratio between the salaries of unskilled and skilled workers. AIA stated that, if the Department of Labor must set a new minimum wage (the previous minimum under the Walsh-Healy Public Contracts Act was from 40-50c per hour), it should be set at the prevailing minimum wage rate of 80-95c per hour.

Establishment of the proposed new $1.15 minimum wage would also affect the commercial market, for although the minimum wage technically is applicable only to government contracts, 90% of all aircraft production is government business, and most manufacturers build both military and commercial planes. It would be impossible to have a different wage rate on military and commercial work for the same employe. Some manufacturers feel that the boost would price them out of the commercial market.

There would also be an effect on companies who sometimes manufacture aircraft parts or accessories, but whose primary business is not connected with the aircraft industry. In accepting a contract for aircraft component work, these companies would be forced to meet the $1.15 minimum wage, which would be considerably higher than those prevalent in their own industry.

Final determination rests with the Secretary of Labor, who will get the recommendations of the Wage-Hour Division. The opposing parties will exchange briefs on the subject on Sept. 6 and rebuttal briefs will be filed by Sept. 20. The new minimum rate would go into effect 30 days after the determination announced by the Secretary of Labor.

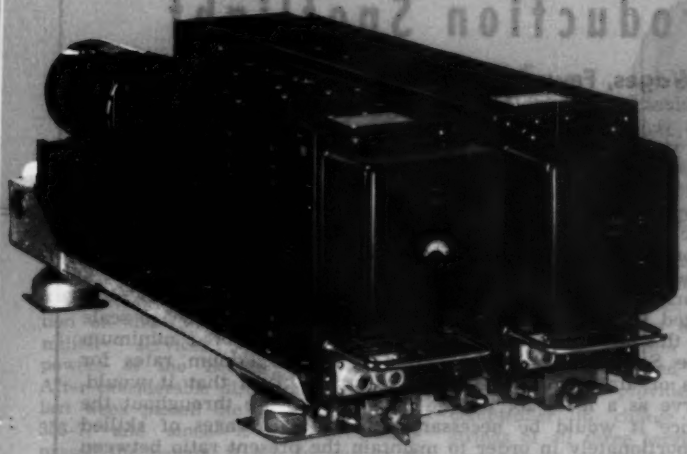
Martin RFC Loan: *In announcing approval of a $1,000,000 loan to The Glenn L. Martin Co., RFC officials went out of their way to express the opinion that the company is in excellent financial shape. Company's obligation to RFC was reduced from about $16,400,000 on Jan. 1, 1949, to approximately $11,900,000 on June 30.*

Move For Chase? State of Connecticut is trying to get **Chase Aircraft Co.**, now located at West Trenton, N. J., to move into the 60-acre aircraft plant at Stratford, Conn., vacated early this year when **Chance Vought Aircraft Division of United Aircraft Corp.** moved to Grand Prairie, Tex. Governor Chester Bowles and Sen. Brien MacMahon of Connecticut have contacted Chase vice-president John F. Ryan and urged him to take over the plant. Ryan said that he had inspected the plant and found it suitable but that he will have to know more about the terms. He admitted that Chase is somewhat cramped in its West Trenton plant.

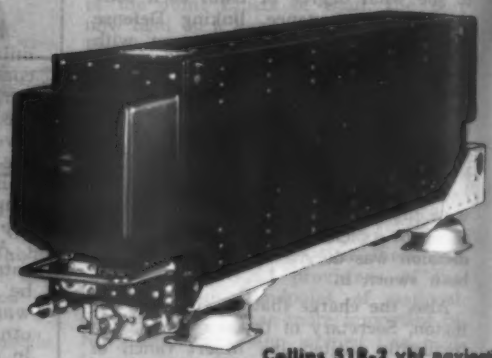
New HQ For Fairchild: *Fairchild Engine and Airplane Corp. is moving its headquarters from the offices at Rockefeller Plaza to its Aircraft Division offices at Hagerstown, Md. The move should be completed by Sept. 15. Maintenance of the expensive New York office was one of the issues which enabled The Stockholders Committee to defeat the former management in the recent proxy fight.*

Industry Briefs: **Lockheed Aircraft Corp.'s** new twin-jet fighter, the Air Force **XF-90**, has completed 16 test flights at Muroc AFB, Calif . . . **Texas Engineering and Manufacturing Co.** is flight testing a commercial model of its **TE-1A** military trainer. The new version is known as the **TE-2A.** . . . **Sikorsky Aircraft Division** has developed the first amphibious helicopter, the **H5H**, which has four wheels fitted into the floats.

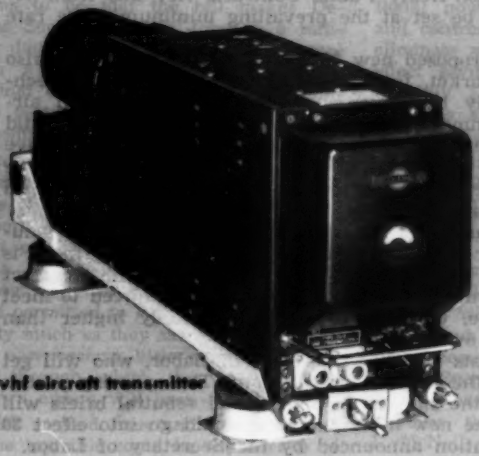
—J. J. H.



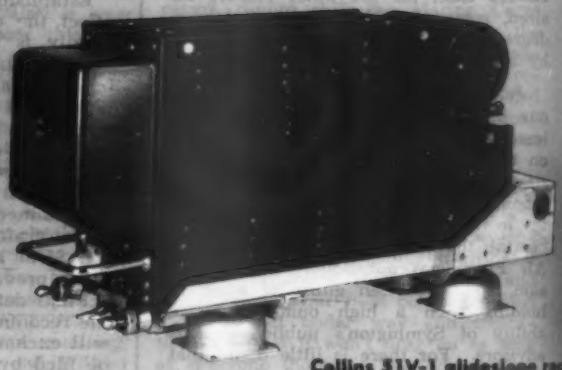
Collins 17L and 51R in dual shockmount



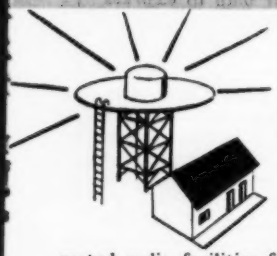
Collins 51R-2 vhf navigat



ins 17L-2 vhf aircraft transmitter



Collins 51V-1 glideslope rece



The development of a full line of navigation and communication equipment for aircraft use in the vhf and uhf bands is a continuing, first-line project at Collins Radio Company.

The purpose is to make available to the aviation industry complete, integrated radio facilities fulfilling all requirements for navigation and communications over the Federal airways.

This program is closely meshed with, and will progress with, the interim and long-range programs of the Radio Technical Commission for Aeronautics.

All of the equipment shown and briefly described on this and the opposite page is brand new, designed to the latest specifications for the applications defined.

51R-2 Navigation-Communication Receiver

The new Collins 51R-2 vhf receiver, available now, is a refinement of the 51R-1, with which the airlines have been familiar since 1947. It covers the frequency range 108-136 mc on a 100 kc channel basis. Full instrumentation circuits are provided in the receiver and accessories for reception and presentation of all radio services now available in this portion of the spectrum.

The channel selection circuits of the equipment are arranged to accommodate addition of a glideslope receiver, such as the Collins 51V-1, to the system. Thus choice of appropriate localizer and glideslope channels is afforded from a single control unit. The 51R-2 receiver is also designed for use as a companion unit to the Collins 17L-2 vhf transmitter, the two together forming a two-way vhf voice communication equipment.

37J-1 vhf Navigation Antenna

The new Collins 37J-1 antenna is designed for use with the 51R-2 receiver. Its band width is 108-122 mc at 5/1 standing wave ratio or better, to feed a 52 ohm unbalanced line. The drag is only 2.63 pounds at 250 miles per hour.

The 37J-1 is constructed of cast aluminum, tubular alloy and natural rubber, and weighs 5.75 pounds. It is CAA type certificated and mounts interchangeably with the type AS-27/ARN antenna.

51V-1 Glideslope Receiver

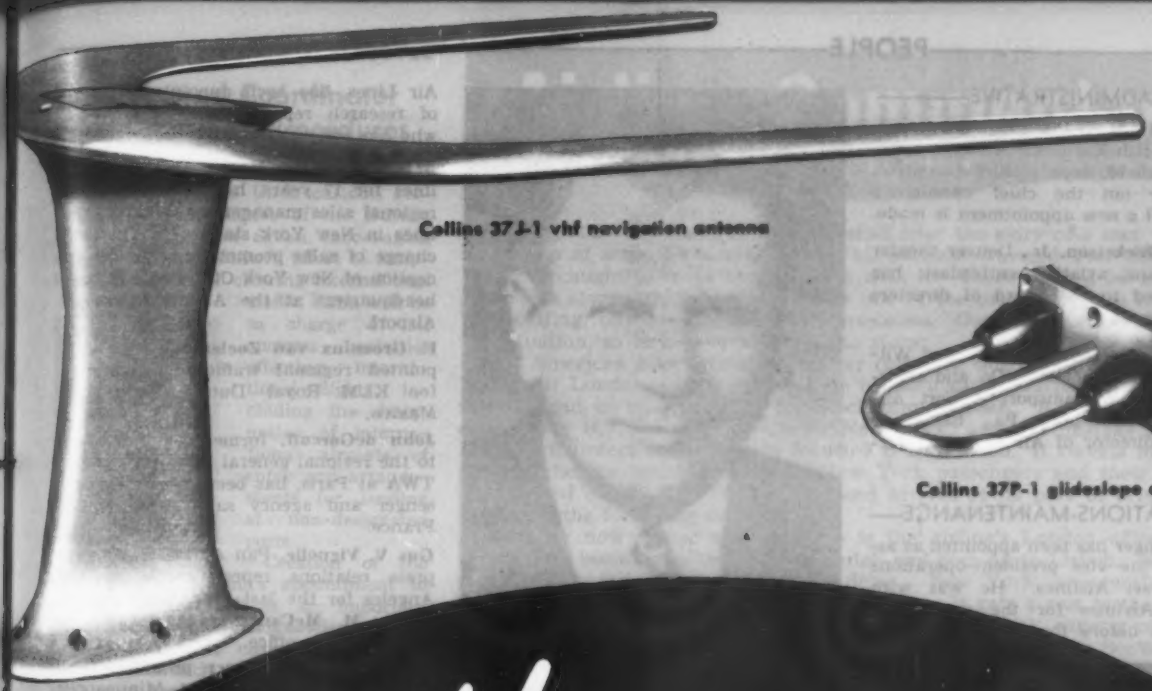
The Collins 51V-1 glideslope receiver, now in limited production, provides reception of 90/150 cps tone modulated glideslope signals on any of the twenty channels in the uhf range of 329-335 mc. This receiver together with the Collins 51R navigation equipment will fulfill ILS receiving requirements for military, commercial and private aircraft. Design of the 51V-1 receiver is based on "Glideslope Receiver Characteristics" issued by Aeronautical Radio, Inc., and on U. S. Air Force specifications.

Output circuits of the type 51V-1 receiver feed standard ID-48/ARN deviation indicators including flag alarm. By means of the flag alarm the pilot has a positive indication of the reliability of the glideslope signals and instrumentation.

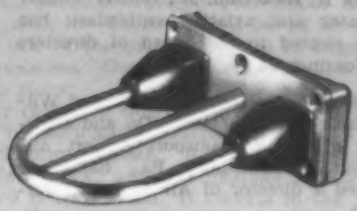
The 51V-1 receiver control circuits are integrated with the standardized R/O channeling system with channel selection provided by means of a Collins 314U remote control unit.

37P-1 Glideslope Antenna

The new Collins 37P-1 antenna, for use with the 51V-1 glideslope



Collins 37J-1 vhf navigation antenna



Collins 37P-1 glideslope antenna

NEW! Equipment to implement the VHF program

receiver, is engineered for reception of horizontally polarized signals in the range 328-336 mc. A standing wave ratio of less than two to one is obtained over this range with the antenna terminated in 52 ohm coaxial cable. The 37P-1 is constructed for mounting horizontally (±30°) on the nose of an airplane with the coax fitting protruding through the skin of the ship. The design is such that it may be used on pressurized cabins. With this antenna properly mounted, an increase of from 6 to 10 db in voltage pickup is obtainable over dipole antennas now installed for this use.

17L-2 vhf Transmitter

The new Collins 17L-2, available early this fall, provides transmitting facilities on all channels reserved for aircraft communication in the vhf band. Its frequency range is 118.0 to 135.9 mc, and all of the 180 channels assigned in this range are easily selectable over a simple and positive remote control system. The power output on phone is conservatively rated at eight watts, assuring that transmissions will be received and acknowledged at the busiest air terminals.

The 17L-2 transmitter is intended as a companion equipment to the Collins 51R vhf navigation-communication receiver. This receiver, together with the 17L-2, will provide full two-way voice communication facilities on all Federal airways vhf communication channels.

* * *

Illustrated bulletins are available, providing more detailed descriptions and the operating specifications for these two receivers and the transmitter, together with their accessories. You are invited to write for your copies.

IN AVIATION RADIO, IT'S . . .

COLLINS

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 W. 42nd St.	2700 W. Olive Ave.	M & W Tower	Talbot Bldg.	Fountain City Bank Bldg.
NEW YORK 18	BURBANK	DALLAS 1	DAYTON 2	KNOXVILLE

ADMINISTRATIVE

J. V. Wood has resigned as chief executive of British European Airways Corp. **Peter Masefield**, deputy chief executive, will carry out the chief executive's duties until a new appointment is made.

Frank H. Ricketson, Jr., Denver theater operator and aviation enthusiast, has been elected to the board of directors of Continental Air Lines.

William R. Waldeisen, president of Williamsport Narrow Fabrics Co. and chairman of the Williamsport Airport Authority, Williamsport, Pa., has been named a director of All American Airways.

OPERATIONS-MAINTENANCE

E. G. Baringer has been appointed as assistant to the vice president-operations of Northeast Airlines. He was with National Airlines for the past three years, and before that was with Eastern Air Lines for 19 years. **John W. Streeter**, director of crew scheduling for NAL since April, replaced Baringer as superintendent of passenger service.

Baringer

Streeter

H. R. Shortman has been advanced from supervisor of communications procedures with American Airlines to superintendent of communications for the eastern region. Others named as regional superintendents are: **H. P. Miller**, central; **R. M. Warriner**, southern, and **O. D. Haley**, western.

T. J. Healy has been appointed to head the newly-created maintenance standards branch of AA's operations department, with **J. H. Casey** as his assistant. **R. A. Miller** heads the new maintenance operations branch, with **D. C. Davis** and **R. B. Wilson** as assistant superintendents. **W. W. Todd** is assistant to the director of maintenance.

Captain Ted J. Johnson, division check pilot, has been named chief pilot-Memphis for Chicago & Southern Air Lines. Johnson is a 10-year pilot with C&S and has more than 11,500 hours flying time.

TRAFFIC & SALES

K. Jack Howe, formerly district traffic manager for Chicago & Southern in Detroit, has been promoted to system manager of agency sales. **Robert L. Young** was transferred from Jackson, Miss., to fill the Detroit vacancy.

Joins Honeywell— Brig. Gen. E. H. Salzman, U. S. Marine Corps, Ret., has joined Minneapolis-Honeywell Regulator Co. as assistant director of the Aeronautical Division. Salzman, a graduate of the U. S. Naval Academy, class of 1926, will supervise Honeywell's expanded program in the development and manufacture of aeronautical controls. Among the products covered by this assignment are electronic auto-pilots for military aviation plus navigation and flight control systems.

William R. Wood, a 15-year veteran with United Air Lines, has been named traffic and sales manager at Fort Wayne, Ind., succeeding **J. R. Kelleher**, resigned.

Ken Fraser has been named sales representative for Western Air Lines at Long Beach, Calif., replacing **Oak Smith**, who resigned to join the Ford Motor Co.

Doris Cook has been named superintendent of reservations for Pioneer Air Lines, replacing **Lucile Reasoner**. She has been reservations office supervisor for two years.

Walter Rauscher has been promoted from sales representaitve agency for AA in New York to district manager-agency sales, replacing **Joe Terry**, who has gone in the travel agency business in New Jersey.

F. J. (Fritz) Schwaemmle, formerly a Delta Air Lines captain, has been named assistant to the general sales manager.

James Mitchell, formerly manager of traffic and sales control for Western Air Lines, has been appointed director of research replacing **Harry E. Karst** who has resigned.

A. L. (Al) Emery, with American Airlines for 17 years, has been appointed regional sales manager for Colonial Airlines in New York state. He will have charge of sales promotion, with the exception of New York City, and will have headquarters at the Albany Municipal Airport.

F. Groeninx van Zoelen has been appointed regional traffic representative for KLM Royal Dutch Airlines in Mexico.

John deGorcuff, former staff assistant to the regional general sales manager of TWA at Paris, has been appointed passenger and agency sales manager for France.

Gus V. Vignolle, Pan American Airways press relations representative in Los Angeles for the last year, has resigned. **Henry M. McCance** is temporarily in charge of the office.

Claude League has been promoted from TWA district manager at Minneapolis to manager of passenger sales at Chicago. He succeeds **Jack Ebbert**, who resigned to enter private business.

N. W. Waldron has resigned as district manager for TWA in Indianapolis to become associated with Holiday magazine. **Robert Kail**, former senior sales representative, has been named acting district manager.

Bob Fletcher, formerly lead ticket agent for TWA at Indianapolis, has been promoted to reservations manager, replacing **Ed Rice**, now in the sales research department in New York. **Jim Leonard** was promoted from ticket agent to lead ticket agent.

Others in the News

Claude H. Smith, acting ICAO liaison officer, Civil Aeronautics Administration, has been appointed a member of the Air Navigation Commission of ICAO. He replaces **H. Walker Percy** who resigned to return to private business.

Robert Gunnell, formerly secretary-treasurer of National Flight System, has succeeded Movie Actor Dick Powell as president of the organization.

A. M. (Tex) Johnson, 1946 winner of the Thompson Trophy Race and for six years test pilot for Bell Aircraft Corp., has joined Boeing Airplane Company as an engineering division flight test pilot assigned to the XB-47 Stratojet test program.

Arthur M. Young, aviation engineer, has been awarded the Edward Longstreth Medal of the Franklin Institute of the State of Pennsylvania. Young received the award for his successful application of flying scale models to test unproven ideas in helicopter flight. The Bell helicopter was designed and built under his guidance.

Flinn Named Coordinator For Air Customs Procedures

Appointment of Burke H. Flinn, 30-year veteran of the U. S. customs service, as air coordinator of the Bureau of Customs is seen as an encouraging step in the government's effort to simplify procedures for clearing international traffic. Flinn will be in charge of all customs activities affecting international flights, including the designation of international airports of entry and arrangements for landing at non-designated ports.

Flinn

Creation of the new office and Flinn's appointment to it were interpreted as an important move by Customs in acknowledging the fact that aircraft clearance must be treated differently from the routine of surface transport. According to Huxley H. Galbraith, Pan American Airways, chairman of the International Air Transport Association Facilitation Subcommittee, the appointment "is final proof that air transport will not continue to be governed by the rules and regulations developed for obsolete forms of surface transport."

Flinn is chairman and secretary of the Interdepartmental Committee on Airports, chairman of the U. S.-Canadian Air Facilitation Committee, and a member of the U. S. Subcommittee for the Facilitation of International Air Tranport.

Sternberg Leaves AA for NAL

Walter Sternberg, 18-year veteran of air transportation, has resigned as assistant v. p.-sales of American Airlines and has been named v. p.-sales of National Airlines. He will be based in Miami and will assume his new duties Sept. 6. Sternberg was general traffic manager of Eastern Air Lines before joining American three years ago to handle international traffic relations.

H. C. Dobbs has resigned as v.p.-traffic and as a director of National. He has made no announcement of future plans.

Wentz Takes AA Daily Post

Daniel S. Wentz II, on the staff of *American Aviation Daily* since 1945 covering Civil Aeronautics Board developments, has become managing editor of the *Daily*. He succeeds Clifford Guest, who recently resigned to become editor of *Planes*, publication of the Aircraft Industries Association, Washington, D. C.

Airline Commentary

By ERIC BRAMLEY

NOW LISTEN my children and you shall hear the story of a man who took a trip of some 6,000 miles, while his suitcase traveled over 22,000 miles before it caught up with him—or him with it. There were a lot of airlines in on this story, which is undoubtedly one of the prize examples of baggage mishandling, but they shall remain nameless. Our informant was close to the situation, so let's have him tell the story:

"An American businessman, hereafter called A, boards a plane at Idlewild bound for London. At the same time his suitcase, hereafter called B, is, by mistake, put on board a plane for Stockholm, Sweden. A arrives in London and misses B. The airline informs New York, and the mistake is traced. New York orders Stockholm to forward B to London. B travels to the airport on the bus which carries the New York passengers and their baggage. B is loaded on the New York plane and arrives at its port of original embarkation the following day.

"A is by now rather upset and so is the airline's London office. A has finished his business in the British capital, and goes on to Lisbon. New York is ordered to send B there without delay. New York, apparently getting nervous, puts B on a plane for Bermuda, where it gets a rest in the lost and found property department. It is traced when New York, eagerly cabling all over the world, also happens to ask Bermuda to look for it. Bermuda puts B on board a plane wholly reserved for a conducted tour of wealthy South Americans on their way home via New York, and forgets about it. In New York, the whole party plus piles of luggage is transferred directly to a plane for Rio via Miami. So is B.

"A is by now getting slightly hysterical and so is the Lisbon office of the airline. New York, however, discovers the mistake when B is half way between that city and Miami, and instructs Miami to unload B and return it quickly as possible. The Rio plane is delayed, however, and in the rush Miami forgets all about B, which goes on to Rio de Janeiro. A has now finished his business in Lisbon and goes to Rome. The Lisbon office of the airline, informed by New York of the whereabouts of B, instructs Rio to send it to Lisbon. This is actually done a couple of days later, when Rio discovers B in a corner at the airport.

"Lisbon loads B on the aircraft for Rome. However, due to weather conditions Rome is closed and the aircraft lands at Athens, where B is unloaded to be shipped to Rome at the earliest opportunity. A, having finished his business in Rome and quite confident that he will never cast eyes on his 'traveling' suitcase, happens to proceed to Athens. Believe it or not, when deplaning in Athens he is met by B, properly tagged and all ready to depart for Rome!"

We are assured that this story is factual and has not grown with the telling. If we were finishing it, we would say: "For the return journey to the U. S., Mr. A got a pair of strong handcuffs, put one around his wrist and the other around the handle of his bag. They were inseparable companions thereafter."

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The following appeared in United Air Lines News: "Clela Olson of Fresno traffic sends along an item about the slightly heavy passenger who, noticing the three-letter code for Fresno on her gate pass, asked plaintively, 'Do you have to know my weight?'" Intrigued, we immediately dove for our Official Airlines Guide to bone up on Fresno's three-letter code. It's FAT.

•

Clarence Belinn, president of Los Angeles Airways, which flies all them helicopters around Los Angeles, thinks he has a pretty fair on-time operation. We are not inclined to disagree after hearing the following story. Seems like a distinguished passenger was arriving via airline from the east, so Clarence arranged to send him (via helicopter) to a heliport near his home, where his wife could pick him up. The passenger asked what time he would arrive at the heliport, so he could inform his wife. After checking with operations, Clarence told him the landing would be at 12:23 or 12:24 p. m. "After the flight had departed, I was curious as to whether we would make his schedule because there were five landings previous to his debarking point," says Clarence. "Believe it or not, we dumped the guy at 12:23:30." And then Clarence, who isn't averse to a sly remark now and then about his bigger brothers in the industry, adds: "And the pilot, like everyone else in our company, did not have one of those watches I hear advertised over the radio guiding all the airlines. Instead of that, I believe the flight was under the influence of an old war surplus time piece!"

Improved Ground Service:

Pit and Underwing Servicing Proved Successful by NWA

By William D. Perreault

While a number of airlines and aircraft manufacturers have expressed interest in underwing fueling, and airports in general have conceded some advantages for pit-type servicing facilities, one operator has taken the initiative and arrived at some concrete facts and figures of interest to the industry. That operator is Northwest Airlines. Recently NWA reported its findings to members of the Air Transport Association.

While some of the servicing pits in use are very extensive, providing for AC and DC power, air conditioning, fuel, oil, compressed air, sewage disposal and flood lighting; the greater majority at this date simply supply fuel and electrical power.

Northwest has 500 amp, 27½ volt DC power units in pits at 21 stations; four more are under construction. Eight power units of 1,500 amp and two more of 1,000 amp capacity at 27½ volts DC have been installed at other points. Results: Experience shows initial cost of under-apron pit installations of this type to be less than that of comparable mobile units. Average cost of 27 of these 500 amp unit installations was $3,647. This compares with $3,800 for a similar unit mounted on a Dodge truck.

Northwest estimated average cost of eight 1,500 ampere pit installations at $10,520 compared to $18,000 for a mobile, truck mounted unit of this capacity. Based on similar estimates, there would be a saving of $675 per year in the operating cost of the 500 amp pit mounted power unit as compared to a mobile unit. Parallel saving for a 1,500 ampere system would range from $1,890 to $4,500, averaging $3,165.

Six of NWA's stations are using fuel servicing pits of 200 gpm capacity; 11 more pits of this capacity are scheduled for 1949 and 21 additional units, for seven stations, are being planned for 1950. Thirteen fueling pits with 50-60 gpm capacity are being used at 10 other stations.

Average cost of a 200 gpm pit set up, complete, is $7,000. NWA's experience shows that such installations will pay for themselves in three to five years and after this period will provide a saving of $1,500-$2,000 per year for every truck eliminated.

Trucks Cost More. Fueling trucks of 2,700 gallons capacity, capable of handling 200 gpm, cost between $17,000 and $20,000, according to this operator. This will be a direct cost if the airline purchases the truck and will have to be amortized accordingly. If the truck is supplied by the fuel company, the airline will be contributing to the cost of truck operations to the extent of from ¼ to ½c per gallon of fuel. Multiplying this figure by the yearly fuel consumption figure, say the NWA engineers, will establish what the "free" trucks are costing.

What are some of the other advantages of this type fueling service? By eliminating the fuel truck, congestion on the ramps is reduced; accidents involving trucks, personnel and passengers are reduced; damaged aircraft are minimized. Dependable year-round service is insured and delays resulting from inoperative gasoline engines and related troubles are considerably reduced. Servicing periods are noticeably shorter and direct operating costs are cut. Another factor is that electrically driven generators and pumps used in pit installations replace the more expensive and trouble-ridden gasoline engine driven arrangements.

Some of the factors affecting the advisability of substituting pit-type installations for mobile equipment include: "length of runs, location and size of existing sources, type of soil, apron construction, water table and drainage, local, state and federal codes, permanency of installation and many other factors" which directly affect the net cost.

Increasing Acceptance. Northwest's experience and leadership in this field has played a prominent part in stimulating airport acceptance of pit-type servicing systems. At the Seattle Tacoma airport a 4 x 4 ft. concrete utility tunnel has been built under the center line of the parking circle on the apron. Each gate position will be served by suitable access manholes. Lighting pits are also being installed on the apron.

At the Greater Pittsburgh Airport and at Chicago Orchard Airport underground fueling pits are now under construction while at Anchorage International Airport and Philadelphia International Airport similar provisions are included in present plans.

Philadelphia, Anchorage and Chicago will also feature utility tunnels while Greater Pittsburgh Airport will have both air conditioning, AC and DC power provided by underground pit installations.

Northwest's experience with underwing fueling has been equally successful. Some twenty months of experience with the Martin 2-0-2's has prepared NWA for operation of the Boeing 377's

Commando Conversion—American Airmotive Corp., Miami International Airport, has completed the second of a fleet of C-46F tailor-made conversions for Alltrans Co., Inc. of New York City. The 40 passenger Commando luxury liners will be used in European passenger operations. Conversion project includes reclining seats, removable for cargo stowage, heater conversion, baggage compartment modification and the installation of a fire detection system. Additional windows, to provide one for each pair of seats, are being added in each plane. The company which maintains Pan America's entire Commando cargo fleet, claims a record of 22,000 C-46 engine hours without a failure.

which will use this type servicing facility. On the 2-0-2, underwing fueling cut actual pumping time in half. It also eliminated extensive use of ladders, general damage to the aircraft from service personnel climbing all over it, accidents associated with ladder usage, and general work in high places.

Fuel agitation and associated vapor loss are considerably reduced by bottom loading with a saving which one company indicates to be between .1 and .25 of 1% of the fuel handled. There is also the more obvious advantage that underwing fueling reduces the number of personnel needed.

Further Study Planned. Experience with the underwing fueling facilities on its twin engine 2-0-2's, where flights are relatively short and fuel load light, has stirred interest in a system of this type for the Douglas DC-4. Although Douglas has been unwilling to work out the necessary details for such an installation, Northwest is going ahead with such a study on its own.

One Convair Liner operator and another DC-6 operator have expressed interest in adapting underwing fueling facilities to their own equipment. Northwest has agreed to furnish any of its future findings to interested airlines. Western Air Lines' Convairs are equipped for underwing fueling.

NWA indicated that several manufacturers have spent thousands of dollars in research and development which has improved underwing fueling equipment. Among the developments: a collapsible hose (Wayne Collaps-A-Hose) with control switch at the nozzle; an evacuated solid hose (Bowser, Inc.); temperature compensating, pound dispensing meters; dial control of total fuel quantity—by setting a dial fuel will either be pumped into or pumped out of the aircraft; underwing nozzle with automatic shut-off, safety shut-off and surge protection for the aircraft tank, improved gaging, etc.

With the exception of Washington National Airport, NWA has underwing fueling facilities at all domestic stations. Normal fuel stops have 200 gpm systems, while at alternate and low fuel take-on stops, 50 gpm systems are still in use. NWA engineers had particular praise for the Wayne Collaps-A-Hose which they use for the 200 gpm installations.

Five major components of this system, as listed in the presentation, are: the pumping and fuel dispensing system; underwing nozzle, tank fitting and its primary safety shut-off; the pressure relief valves for tank protection, and the bottom gaging facility.

The **NWA-ATA** paper, a handy guide for anyone considering the use of fuel servicing pits or underwing fueling, lists the manufacturers of all the major assemblies. The report concludes: "Underwing fueling results in improved ground service, and for that reason should be advocated both by airlines management and by airline ground personnel."

Disc Fixer—Mathew Harmon, United Air Lines mechanic, is shown using the massive hydraulic press at UAL's San Francisco base to straighten brake discs. These are the 40-pound single disc units used in the DC-6. High temperatures and friction tend to warp the disc during service and the press is used in overhauling the disc for continued use. The press is a big time saver.

C-54 Face-Lifting Planned By TWA To Boost Appeal

Finding that Constellations have a decided edge in passenger preference, Trans World Airline is planning a "face-lifting" program for its fleet of 10 C-54 Skymasters used in international operations. Physical changes in the airplanes, together with additional passenger services en route, will be made in an effort to increase the currently light C-54 load factors. Losing overflow Constellation passengers even though C-54 space was available, the company decided a dressed-up Skymaster would lure them back.

Recommendations made by TWA's passenger and cargo service department include replacement of metal cargo compartment linings; installation of plastic coverings on forward cabin bulkheads, which have been scarred and torn by cargo loads; removable curtains to separate passengers from cabin cargo; and cargo seat bags to improve the appearance of the passenger cabin.

Plans include reworking in the lavatories, increasing the water supply and installing standard towel racks.

Although food service standards are now the same on both planes, except for the Constellation "Blue Banner" runs, the Skymaster passengers will be given "a little extra in the way of food service" and the meals will be served in courses. Liquor service, now available from the United States to Paris and Lisbon, will be extended east to Bombay.

TWA uses three types of C-54's on international schedules; models B and E in passenger service, and the C-54G cargo model. With multiple crews the C-54B seats 40 and the E model 38 passengers. The 749 Constellation carries 38 with additional crew aboard. Lack of pressurization on the C-54's limits the comfortable operating ceiling to below 12,000 feet.

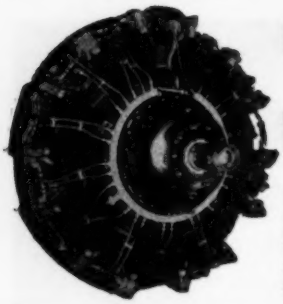
"Face-lifting" of the Skymaster fleet will be accomplished as each plane is routed through TWA's overhaul base at Kansas City.

NEA Pilot Charged With Low Flying in N. Y.

A Northeast Airlines pilot has been summoned by the aviation bureau of the New York Metropolitan Police Dept. for allegedly making a low approach to LaGuardia Field and neglecting to conform to the approved traffic pattern. A spotter stationed in the control tower, following complaints of low flying in the vicinity of the field, gave the pilot a ticket soon after the plane landed.

The hearing will be held on August 17 at which time the pilot, Capt. George R. Newhouser, will plead not guilty. Northeast Airlines is investigating the charge and will send representatives with Newhouser to court. To date, CAA has not filed a complaint against the pilot.

Meanwhile in Newark, N. J., the Board of Public Works has petitioned CAA to set up an inspection service to check on low-flying planes over the city following take-off from Newark.



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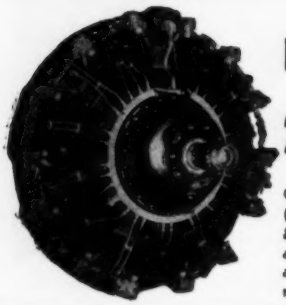

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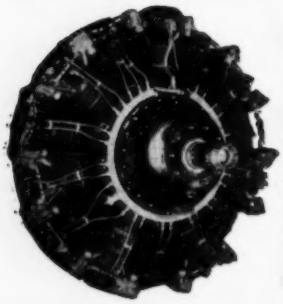

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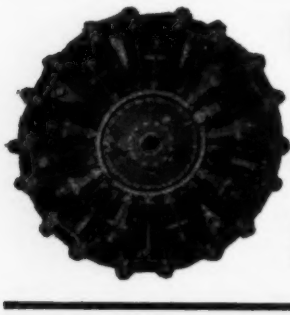

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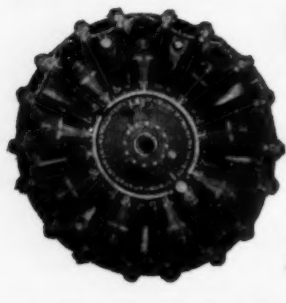

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CAB Officially Blames CO_2 For United's DC-6 Accident

Probable cause of the United Air Lines DC-6 crash at Mt. Carmel, Pa., on June 17, 1948, was the "incapacitation of the crew by a concentration of CO_2 gas in the cockpit," according to CAB's final accident report. While this conclusion has been generally accepted in the industry for some time, there are interesting facts to be noted in a chronological review of the related history dealing with noxious gases in transport aircraft.

The review follows:

June 23, 1947—The DC-6 was certificated by CAA, incorporating all applicable CAR including fire prevention requirements.

November, 1947—The DC-6's were withdrawn from service for extensive modification. To meet compliance with provisions of additional CAR, the aircraft was test flown in January, during the modification program, to determine compliance with rules regarding CO_2 concentrations in habitable compartments. Because of high concentrations the airplane was further modified and additional tests conducted.

During these latter tests, one and two banks of CO_2 were discharged at varying time intervals with the airplane descending from 20,000 ft. at 300 mph. The condition was reported as satisfactory but in issuing instructions for operation of the fire extinguishing system, Douglas included provisions which further insured against dangerous gas concentrations.

January, 1948—Douglas contracted with the Lovelace Clinic to make a study of human tolerance to CO_2 gas. The study, completed in Feb., showed maximum allowable CO_2 concentration at sea-level for operating personnel to be 5% for five minutes. It was established that CO_2 has a toxic effect on the body. Under study by Douglas, the report was not released until after the Mt. Carmel accident.

March 3, 1948—The Air Line Pilot's Association recommended to CAA and CAB that smoke mask type oxygen equipment be required for the crew to provide protection against smoke in case of a fire. CAA, feeling adequate testing had been completed to insure against this, decided it was unnecessary.

April 13, 1949—A second letter to CAA and CAB from the ALPA reiterated the request of March 3 and cited danger of CO_2 concentrations for the first time. CAA initiated a medical study of the matter of smoke and noxious gases.

May 13, 1948—TWA experienced an emergency Constellation landing at Chillicothe, Mo., when, following a false fire alarm, the crew discharged CO_2 into a lower baggage compartment. A circulating booster fan and inherent design of the aircraft allowed CO_2 to reach the cockpit in dangerous percentages. Test flights following the incident verified the fact that this incident was caused by CO_2.

June 10, 1948—ATA, acting on data obtained from TWA, recommended to the airlines that certain procedures be followed in the event of a fire emergency and that DC-6 operators should conduct tests to determine how the information applied to their aircraft.

June 14, 1948—Douglas Aircraft Co. notified ATA by telegram that they should withdraw any reference to the DC-6 from the earlier telegram and added that tests to determine this factor were dangerous. The DC-6 procedure, advised Douglas, had been set up following entensive tests and had CAA approval.

June 15, 1948—United Air Lines decided to instruct all DC-6 crews to use oxygen masks when CO_2 is released. The bulletin advising this new procedure was not published as of June 17, the date of the accident.

Following the DC-6 accident at Mt. Carmel, Douglas conducted 59 flight tests for CO_2 concentrations in the cockpit and cabin of the DC-6. It was discovered that, while in a descent from 20,000 feet at 300 mph, dangerous concentrations did not occur; at 160 mph descent from this altitude with flaps and gear down, a maximum concentration of 7.8% occurred. This configuration was one approved in the CAA airplane operating manual for this airplane.

With this chronological history, it might be simple to blame any number of people for contributing to the condition; however, CAB in its report cites the fact that "had the crew followed the emergency procedure (as carried in the airplane operating manual) on such a descent configuration, it appears that the accident would have been avoided."

But the blame did not rest with the pilot. Adds the CAB, "Too little consideration has been given to the psychological and physical limitations of crew members in time of stress and danger as related to the complexity of emergency fire procedure. It is not safe to assume that the pilot and co-pilot, under emergency pressure, will always adhere rigidly to the sequence of steps outlined in the CAA approved airplane operating manual."

"Douglas," concludes the report, "has designed and is testing a modified fire extinguishing system which will permit all necessary steps to be executed by the movement of one control."

Hearing on Standard Crash

During CAB's public hearing into the crash of a Standard Airlines C-46 at Chatsworth, Calif., on July 12, the following facts were established by testifying witnesses: At the time of the crash the airplane was operating under IFR and had been cleared for a straight in approach. The landing gear was down, engine at half throttle and the equipment was not malfunctioning.

CAR governing operations in this area require a minimum altitude of 4755 ft., but according to the testimony of one CAB investigator, first contact with the ground was at 1890 ft. on the side of a 2320 ft. peak. The overcast was about 2200 ft. at the time of the accident, but the ship was equipped with navigational aids, ILS and a radio altimeter.

The pilot, Roy White, had logged some 6,000 hours and was considered to be exceptionally competent by Louis Powell, Standard's chief pilot. The possibility that the one-punch fight between two passengers had any relation to the accident was discounted in the hearing and later report.

Miami Bound—This is the type of truck, a White model WB-22T Super power tractor-trailer, used by Aircraft Haulage, Inc., to haul engines between New York and Miami for Pan American World Airways. All engines used in PAA's four engine equipment are overhauled at the Miami overhaul base. These trucks make three or four round trips per week carrying from three to five engines each way.

Cost of Non-Standardization

Speaking before the standards committee of the Aircraft Industries Association, Jim Franklin, v.p.-operations, Capital Airlines, recently commented, "While nothing big has actually been done about standardization of airplane components, we can at least throw out our chests, clear our throats, and say in a loud, firm voice that we are all *for* it. Beyond that point agreement sort of trickles off into limbo."

Capital's own engineers and supervisors are in favor of standardization, said Franklin, but they agree that "We can't use *their* generators." This also applied to *their* brakes, *their* propellers and *their* radio. Yet standardization of instruments would permit Capital to use 500 fewer instruments, saving some $12,500.

A non-standard vacuum relief valve bushing costs some $5.50 compared to 50c for a similar unit on a standard model. Fuel pressure diaphragms for non-standard instruments cost $15.50 each compared to $5. for a parallel, standard diaphragm for a Kollsman altimeter, said Franklin. He concluded, "You do not have to be a fanatic on the subject, nor do you have to be told by such a fanatic that the cost of non-standardization of almost any airplane part can run into 6 or 7 digits quickly when we consider the economy of inventories, mass production, maintenance tooling, training and universal interchangeability which standardization makes possible to the industry."

Chicago Accident Blamed On Rapid Descent

In a final report of the incident in which an American Airline's DC-6 struck the high tension wires at Chicago Municipal Airport while making an approach last Mar. 26, CAB blamed the accident on a rapid descent made "without regard to the glide path indication" which brought the plane into contact with the wires. No one was hurt and the aircraft made a routine landing at Indianapolis.

Contrary to published reports, the CAB found that the ILS indications reported by the pilot were correct and tests of flight and ground equipment following the incident revealed normal operation, although a weak tube in the aircraft set could have caused intermittent operation. The crew, Capt. Ray D. Wonsey and H. D. Schmidt, should have been aware of the high tension wires since they were marked on the company's ILS chart with a suitable note of caution.

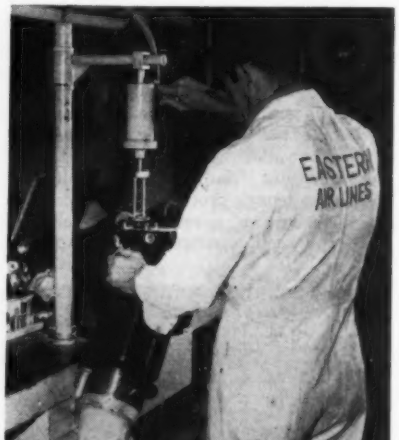
Investigation indicated that the pilot passed the outer marker at the proper time but at an altitude 500 to 600 ft. higher than required. In attempting to lose altitude rapidly, the pilot descended at about 1300 fpm and an airspeed of 150 mph. Although he started slowing his descent at 350 ft. the plane had passed below 300 ft. before the descent was checked. The ship struck the wires 1¾ miles from the airport at approximately 145 ft. above the field elevation.

Brabazon Power Unit OK'd

Following completion of the Air Registration Board 150 hr. tests, the ARB has approved the twin Bristol Centaurus power unit designed to power the Bristol Brabazon. Eight of the Centaurus engines will be used in pairs to drive four sets of propellers on the 127 ton, 100 passenger Brabazon. Each of the combined powerplants will be rated at 5,000 hp.

The ARB tests climax 1200 hrs. of development running. During the tests the engines were operated 80 hrs. at maximum continuous power, 10 hrs. at take-off power, 20 hrs. at maximum weak mixture power and 40 hrs. at various cruising powers.

The tests, according to British authorities, prove that the Bristol company has been successful in overcoming vibration that has defeated previous attempts at coupling two powerplants of this size and power.



Valve Spring Compressor— This photo shows a simple valve spring compressor used by EAL at its Miami overhaul base to facilitate valve installation and removal. The cylinder is mounted on a post that holds the valve in place and the associated mechanism used to compress the spring to simplify installation of the holding clips. The actuating device is a discarded oil cooler actuating strut from a DC-4 airplane, but as used here it is operated by air pressure which enters the strut through the control valve on top of the strut.

Among the Suppliers

Karl F. Kellerman, formerly executive director of the RDB's committee on guided missiles, has joined the **Brush Development Co.** of Cleveland, O. Kellerman will direct operations of the newly opened Washington, D. C., office of the Brush Development Co., manufacturers of a wide range of electro - mechanical products . . . **Robert H. Davies,** formerly with Lincoln Electric Co., has joined **Baker-Raulang,** of Cleveland O., as manager of engineering.

Kellerman

Biggs Boiler Works Co., Akron, O. has completed manufacture and testing of a 15-man high altitude chamber which was constructed for the Uruguayan Air Force. The chamber simulates altitudes up to 70,000 ft. It is divided in two compartments 22 ft. long and 10 ft. in diameter and weighs some 30,000 lbs. Unit cost approximately $35,000 . . . A rubber-cushioned steel shipping shell for Westinghouse J34 jet engines has been built by **The Firestone Tire and Rubber Co.** The cylindrical container is 138 in. long and 47 in. in diameter. The unit is sealed, pressurized and mounted on skids attached to the container through air springs which can be regulated to suit varying loads.

TEMCO, Texas Engineering and Manufacturing Co., has received an order from the Ecuadorian Air Force for $10,000 worth of spare parts for C-47's, PT-19's and AT-7's . . . **Southwest Airmotive Co.,** Love Field, Dallas, has appointed **George Handwork** as superintendent of their radio shop . . . **Dr. Paul J. Brodeur** has been appointed chief chemist of the metal finishing division of the Pyrene Mfg. Co., Newark, N. J. . . . **James P. Malmstrom** has been appointed assistant to the General manager of the **Standard-Thomson Corp.,** Dayton, O.. **Rome Cable Corp.,** Rome N. Y. has received CAA approval of its RoMarine-RoPrene and RoZone-RoPrene cables for airport wiring under CAA specification L-824 . . . **George W. Pew** will head the newly created process engineering department of the **Detrex Corp.,** Detroit, Mich. Detrex manufactures degreasing and washing machinery, drycleaning equipment, etc.

General Electric Co. is celebrating the 10th anniversary of the all-glass sealed beam headlamp design this month. The latest application of GE sealed beam lamps in the aviation industry, and possibly one of its more important uses in aviation, is as a component of the high intensity, slope line approach lights, now the ANC standard. . . . **Dr. Falih N. Darmara** has been appointed director of metallurgy and research for **The Utica Drop Forge & Tool Corp.,** Utica, N. Y. . . . **L. S. Starrett Co.,** Athol, Mass. has purchased the **Burrill Saw and Tool Works** of Ilion, N. Y., manufacturers of band knives and band saws. Starrett also manufactures hand measuring tools, precision instruments, steel tapes, etc.

Joint Communications System For International Carriers

In connection with plans to operate a consolidated radio communication system for accommodation of trans-Pacific and international air carrier communications, Aeronautical Radio Inc., has been negotiating with the San Francisco International Airport for some 1,000 sq. ft. of office floor space.

Initially the ARINC center would handle United and Pan American's communications and later this would be expanded as indicated. Although no space was immediately available, it is believed that suitable provisions will be made in the near future.

Daily Plane Utilization International

		Mar.	April
AA	2 eng. pass.	2:32	....
	4 eng. pass.	5:48	6:05
	cargo	4:33	4:42
AOA	2 eng. pass.	1:25	1:28
	4 eng. pass.	5:47	6:18
Bnf	2 eng. pass.	2:47	2:32
	4 eng. pass.	5:50	6:07
C & S	2 eng. pass.	7:38	7:35
	4 eng. pass.	6:54	6:07
Col	4 eng. pass.	5:08	5:46
EAL	4 eng. pass.	9:29	10:45
NAL	4 eng. pass.	8:53	8:36
	cargo	2:23	2:22
NWA	4 eng. pass.	10:25	10:30
Panagra	2 eng. pass.	4:18	4:16
	4 eng. pass.	5:31	5:28
	cargo	4:25	4:52
PAA			
Lat. Amer.	2 eng. pass.	3:57	3:44
	4 eng. pass.	8:15	8:11
	cargo	4:37	3:56
Atlantic	2 eng. pass.	4:09	3:40
	4 eng. pass.	6:40	6:29
	cargo	7:51	6:19
Pacific	4 eng. pass.	9:43	7:19
	cargo	11:17	12:57
Alaska	4 eng. pass.	8:23	8:47
TWA	4 eng. pass.	6:18	7:40
	cargo	6:11	7:20
United	4 eng. pass.	6:55	7:02

Feederlines

AAA	Stinson SR-10-C	4:11	3:40
	Beech D-18-C	4:28	6:52
	DC-3	2:31	4:38
Chall	DC-3	7:09	6:39
Empire	DC-3	5:33	5:31
Florida	Beech D-18-C	3:33	*
Monarch	DC-3	6:44	6:52
Piedmont	DC-3	6:45	6:00
Pioneer	DC-3	7:57	7:58
Robinson	DC-3	4:28	3:39
Southwest	DC-3	5:51	5:39
TTA	DC-3	7:27	6:55
W. Coast	DC-3	4:44	4:48
Wis. Cent	Lockheed 10A	4:36	5:11

* Terminated operations at end of March, 1949 in accordance with CAB's decision not to renew airline's temporary route certificate.

Extra Section

By William D. Perreault

DURING the Corporation Aircraft Owners Association meeting in Washington there was a discussion of airline cooperation in the weather information department. The complaint was made that the airlines do not make their weather data available and consequently, while airline pilots are flying at 7500 feet with no icing and clear weather, corporation aircraft are on the ground because of weather Bureau forecasts of icing or no visibility. The issue will be taken up on several fronts in the near future to correlate airline and WB data for the benefit of all concerned.

•

Colonial Airlines is putting 80,000 gallons of gasoline per month through a 1600 gallon fuel truck, according to Shell. With the truck costing about $5400 this amounts to a depreciation of .1c per gallon based on a five year unit life. Northwest pumped 235,000 gallons of fuel in one month through a 2700 gallon truck. This $17,000 truck, over a five year period, would depreciate at about .00125c per gallon.

•

The British Road Research Laboratory has opened new possibilities in the field of colored asphalts in hues such as cream yellow, green, red and blue. Previously it has been difficult to obtain light shades in asphalts although some coloring has been accomplished. This might have some interesting possibilities in runway and taxi-strip designs, particularly for operation in conditions of low visibility.

•

Operating in the sands and dust of Saudi Arabia has its problems. One of them is finding the active runway when sudden sand storms blow up. Operating into Dhahran Field, MATS gets aid from a mobile homing beacon in the form of a transmitter mounted on a desert rescue vehicle. After homing on the Dhahran radio range, and during the final stages of his let down procedure, the pilot switches to the mobile homer which has been driven to the end of the runway.

•

One of the aircraft manufacturers recently suggested to an airline that it would be possible to make a profit of $7 million a year if a given number of new aircraft, costing $20 million, were put in service over their routes. The suggestion was referred to the engineering department for study and comment. The comment read like this, "Interesting! Will the manufacturer be willing to accept the first three years profit as payment on the airplanes?"

•

Each time we visit the office of the Mine Safety Appliance Co. we are impressed with safety equipment which has aviation applications although many items were originally designed for mine usage. Typical of this equipment is the modified combustion air alarm. Weighing about three pounds, this gadget gives an alarm if exposed to combustible mixtures between 10-75% of the lower explosive limit of a majority of items in this category. CAA is reported to be working on the design of just such a unit at Indianapolis.

•

Extending a practice which it initiated over a year ago, Southwest Airways has made arrangements to use two additional commercial radio broadcasting stations as instrument approach aids at Santa Cruz-Watsonville, Calif. Other stations used by Southwest for this purpose are located at Monterey, Marysville, Chico, Eureka and Santa Rosa. When this practice was initiated there was considerable controversy between the airline and FCC, the latter claiming that the basic procedure was outside of the authorization of the commercial stations. At that time the station interrupted regular programs to announce the station identification on prearranged schedules suited to the airlines operation. FCC contended that the practice interferred with public education and enjoyment and had to be discontinued. Since then, the stations have discontinued the special announcements but crews are supplied with the radio programs and frequency information which makes it possible to use the stations without special announcements being made.

NEW PRODUCTS

Communications Package

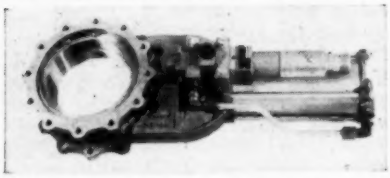
General Electric Co., Transmitter Division, Syracuse, N. Y., has announced a new radio communication unit (model AK-50) for private airplanes. Combination includes a low frequency transmitter, six-channel VHF transmitter and

a two-band low frequency receiver. Cut shows installation on the instrument panel of a Cessna 140, with the transmitter-power supply unit below.

Feature of the receiver is a pre-set tower tuning position which allows change to tower frequency without detuning main dial setting. The unit includes a built-in interphone system and a noise limiter to facilitate reception under heavy static conditions.

In-Flight Fueling Valve

Hydro-Aire, Inc., Burbank, Calif. and 500 Fifth Ave., New York City, has announced a high-capacity shut-off valve for air-to-air refueling. The valve's 4 in. line size accommodates a fuel flow of 600 gallons per minute.



Opening and closing time is 1/10 second with a fail-safe feature in either position. Unit is designed to withstand greater pressure than the fuel line.

Other Hydro-Aire in-flight fueling units include a newly-developed fuel pressure-relief valve, which protects lines from the surge and water-hammer pressures created by the fast shut-off of 600 gpm flow, and a flapper check fuel valve of 4 in. opening that assures fast-action control of fluids.

Six-Phase Rectifier

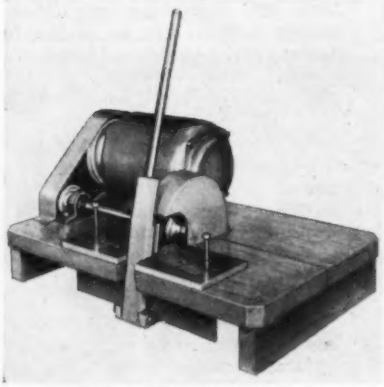
McColphin-Christie Corp., 4922 S. Figueroa St., Los Angeles 37, Calif., has developed a new aircraft rectifier (type E24-500T) for starting engines of jet aircraft and commercial transports. By means of a 12 phase rectifier circuit (six phase full wave), the unit rectifies standard 3 phase AC power into smooth DC power with less than 2% rms. ripple voltage, without filter. Ripple frequency is 720 cps. By use of filter condensers the ripple voltage can be further reduced.

The unit, trade named RECTO-STARTER, has a continuous rating of 500 amperes at 28 volts DC and a momentary load rating of over 3000 amps. A voltage stabilizer holds the voltage drop from no load to full load well within 10%. Voltage variations due to changes in rectifier load within rated output are within plus or minus 5%, or less than 1.5 volts.

Unit can be furnished with up to 50 ft. of AC cable permanently attached and, in conjunction with the company's CR-1 cable reel, range of operation can be extended to 500 ft. from a power source.

Hose Cutter

Aeroquip Corp., Jackson, Mich. has announced the development and production of a hose cut-off machine. The compact, sturdy machine will cut all types of flexible hose including hose reinforced with plies of wire braid. Ac-



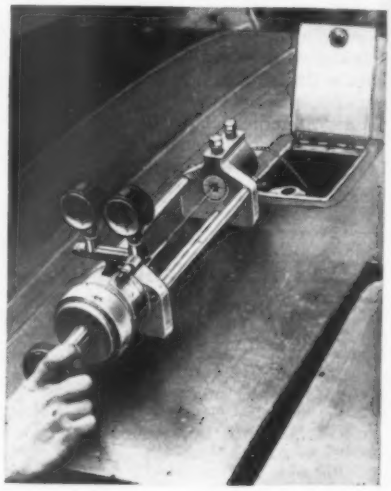
commodating sizes from 3 in. in outside diameter and cutting hose at 90 degrees in relation to the hose axis, the new machine insures against frayed ends. Its design simplicity makes it possible for anyone to operate it and sharply reduces cutting time.

Inquiries about equipment on this page may be sent either to AMERICAN AVIATION or direct to the manufacturer.

Readers looking for sources of special equipment are invited to write to AMERICAN AVIATION's equipment editor. Every effort will be made to provide information on manufacturers and suppliers who are in a position to furnish or develop needed airborne or ground equipment.

Cable Tester

Mine Safety Appliances Co., Braddock, Thomas and Meade Street, Pittsburgh 8, Pa., is marketing a portable tensile testing unit for eye, fork and turnbuckle type terminal fittings swaged to aircraft control cables. The tester



weighs 24 lbs. fully assembled, measures 22 x 5 x 8½ in. and is capable of exerting direct tensile loads up to 5,000 lbs. on terminal-cable assemblies. It will accommodate cable sizes from 1/16 through ¼ in.

Tests may be made either immediately after assembly of a terminal or as a part of general inspection and overhaul. Tension is applied hydraulically by manually turning a small hand wheel which operates a moveable head. The cable is rigidly held in copper-lined retainers which will not damage the strands.

Universal Joints

Lovejoy Flexible Coupling Co., 5001 West Lake St., Chicago 44, Ill. is marketing a series of 14 standard size universals from ⅜ in. to 4 in. hub diameter. The universals are guaranteed to be concentric within .0005 in. The universals

feature specially ground inside forks and bearing surfaces, no pin-binding, back-lash or inplay, and rivets ground flush with the body of the joint. Joints are heat-treated to Rockwell 38 on the C scale.

On special order, joints are magnaflux tested and cadmium plated. Large sizes are equipped with Zerk fittings. An illustrated bulletin describing the complete line of Dix joints is available from the manufacturer.

taking its pulse

at 20,000 feet

Sperry Engine Analyzer

This flight engineer is taking the pulse of a Pan American Clipper† 20,000 feet above the Atlantic... logging the performance of its complex power plant. Graph-like patterns on the Sperry Engine Analyzer* are giving him a continuous visual analysis of each engine. Any irregularity in engine performance is detected, located and identified at once... and precisely enough to isolate one from among the Stratocruiser's 224 or the Constellation's 144 spark plugs.

■ When he lands, he hands the ground crew a complete work sheet specifying each spark plug, valve, magneto or other part in need of servicing. As a result, maintenance is frequently cut from hours to minutes.

■ With its giant Stratocruiser and Constellation-type Clippers equipped with the Engine Analyzer, Pan American estimates that up to 60% of delays caused by power plant troubles can be eliminated.

■ Airline operators can save thousands of dollars annually by supplanting trial-and-error trouble shooting with *electronic trouble shooting* which... reduces maintenance time, tightens departure schedules, lessens over-all passenger transit time and increases aircraft utilization.

■ Pan American is the first airline to install the Sperry Engine Analyzer, the first complete instrument for commercial aircraft to isolate detailed engine difficulties... one of many Sperry products designed to aid commercial aviation.

†Trademark, Pan American Airways, Inc.

*Engine Analyzer is manufactured under license from John E. Lindberg, Jr.

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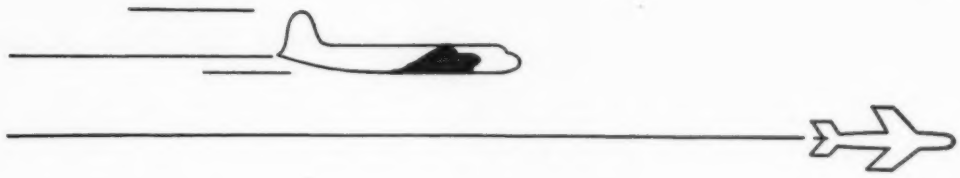

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Largest Airport Temporary Tank Farm

By Robert C. Blatt

Probably the largest temporary tank farm in the country for the exclusive storage and dispensing of aviation gasoline has been placed in operation at the New York International Airport at Idlewild, Queens.

The "farm" is located on a three acre site in the northwest section of the 4900 acre airport. It has 20 gasoline storage tanks, each having a capacity of 30,000 gallons. It is connected with Bergen Basin, which empties into Jamaica Bay, by a 90 ft. timber pier which permits easy delivery of gasoline by barge. With a minimum 15 ft. depth of water, good sized gasoline barges can be used. An eight-inch line connecting the pier with the tanks can carry gasoline at the rate of 1200 to 1500 gallons per minute.

The tank farm facilitates both the storage and delivery of gasoline at the airport and reduces the number of trucks which the gasoline companies will require at the airport. It has five truck stands where the trucks can fill up with gasoline at the rate of 350 gallons per minute located about two miles from the terminal building area.

Before the gasoline is pumped into the trucks it passes through water separators which remove practically 100 per cent of the water. Filters are also provided to remove all dirt from the gasoline.

The tanks are partially underground and are covered by sand which is topped by an asphalt emulsion. A product known as "Gulf Sani-Soil Set" covers the slopes, binding the sand and preventing organic growth.

All buildings at the farm are constructed of corrugated sheet metal protected from the corrosive vapors by a heavy galvanized finish. Each building, except the maintenance building, has complete exposion-proof electrical equipment, including all switches, receptacles, lights, fittings, motors.

Careful Planning. A great deal of care was exercised to make certain that all equipment in the entire system was thoroughly and effectively grounded by using 8 ft. long Copperweld 1 in. round ground rods, ⅜ in. phosphor bronze static leads, 100 ampere heavy duty static clips, No. 2 B&S Gauge or larger wire jumpers.

Five dispensing pumps are installed; one for each of the truck fill stands. Each pump has a capacity of 350 gallons per minute. Fuel is pumped through 4 in. steel discharge lines to the water separators and filters and then to the truck stands. Each pump is equipped with a 15 horsepower, 3 phase, 208 volt, 60 cycle, explosion-proof motor having a direct flexible connection between the motor and pump shaft.

Three foamite hydrant houses are installed at strategic locations around the tank farm to provide the maximum in fire protection. Each house is complete with foam nozzles, hose and foam containers. A 2½ in. pipe supplies water at high pressure to each foam hydrant.

The five truck fill stands each have a fuel flow capacity of 175 gallons per minute from each of the two outlets. The stands are equipped with explosion-proof electrical equipment throughout and elaborate grounding provisions are installed. The entire area is floodlighted to a high intensity to facilitate night operations.

Electric service for light and power is supplied from a transformer and circuit breaker station on an outdoor pad-type installation completely protected by an 8 ft. high, 2 in. mesh steel chain link fence. All switches, circuit breakers, fittings and other electrical equipment are explosion-proof for maximum protection against explosive vapors. Three 25 kva transformers are installed to provide the 120/208 volt service.

This unusually large tank farm installation was made by Petroleum Systems, Inc., of New York City at a cost of approximately $300,000. Plans and specifications for the installation were drawn up by Carrillo and Green Associates, consulting engineers, also of New York City. The entire project was under the supervision of the engineering department of the Port of New York Authority; John M. Kyle, chief engineer and R. F. Schaeffer, engineer of design.

Operation. All 20 of the storage tanks are now in use. Gasoline is supplied by Esso, Shell, Gulf and Texaco.

The Willis Rose Corp. has the contract with the Port of New York Authority for handling the fueling operation and tank farm along with their aircraft service at the airport. Don Eggertsen is the manager of their fueling operation. Petroleum Systems, Inc., handles the maintenance work.

Six 4000 gallon and two 1800 gallon tank trucks are used by Willis Rose in servicing the planes at the field. The trucks are leased to the Port Authority

TEN OF THE TWENTY 30,000 gallon fuel tanks comprising the temporary "Tank Farm" at the New York International Airport, before they were finally covered over with sand and asphaltic emulsion.

by the oil companies and Willis Rose, in turn, leases them from the Port Authority. Approximately 600,000 gallons of gasoline per month are dispensed at the airport at present.

All refueling trucks used at New York International Airport have fusible links which automatically shut off the pumping engines at 165 degrees F. All truck-mounted fire extinguishers have been relocated closer to the front of the tank for easier accessibility. Graphite-impregnated rubber straps are used for grounding tank trucks instead of the less effective conventional steel ground chains. Rubber insulated grounding wire is used throughout with heavy duty copper grounding clips.

All hose nozzles are grounded to the planes—trucks to the planes and trucks to the ground. All grounding rods are at least 8 ft. long, driven below the permanent ground moisture level.

California Uses Unrefunded Fuel Tax Money for Airports

The state of California for the first time will contribute to airport construction as a result of passage by the legislature of a bill to devote unrefunded aviation fuel tax money to this purpose.

The measure segregates motor vehicle fuel taxes collected on aviation gasoline into a special fund. After refunds are made the unclaimed funds, which previously reverted to highway construction, will be made available to counties and cities for capital investments in publicly owned airports.

Each county will first receive $2,500 from this fund and the remainder will be distributed to counties, one-half on the ratio of county population to state population and one-half on the ratio of county area to state area. For cities owning airports, provision is made for sharing in funds allocated to the county in which the city is located.

Airlines Protest Proposed Airport Fees in Pacific

The airlines have protested to CAA proposed landing fees at CAA owned and operated airports in the Pacific, principally on the grounds that they are twice the amount of Air Coordinating Committee approved landing fee schedules for civilian use of U. S. military installations outside the continental limits of the country.

CAA proposed a landing fee (one landing and one take-off) of 32c per 1,000 lbs. of aircraft weight at Wake and Canton Island where it owns and operates the civilian airports. Landing fee charged civilian aircraft for use of military airports outside the U. S. is 16c.

Smith Re-Elected: Robert L. Smith was re-elected president of the Board of Airport Commissioners of Los Angeles for the seventh consecutive year at the annual meeting of the commission.

CAA Airport Program for Fiscal 1950

Fiscal 1950 Federal-aid program of the Civil Aeronautics Administration will involve $29,840,767 in Federal funds with local or state sponsors providing matching funds amounting to $37,432,752. Covered will be 314 projects; 172 Class III and smaller airports, 141 Class IV and larger airports and one seaplane base. CAA funds totaling $24,301,575 will be allocated to Class IV and larger fields.

May 31 ended a three year period during which 284 construction projects were completed. Table shows distribution of federal and sponsor's funds by state and territory and the number of pending and completed projects.

State	No. of Projects	Sponsor's Funds	Federal Funds	Total Funds	Completed Projects From 1947 Thru May 31
Alabama	1	$482,500	$420,500	$903,000	4
Arizona	4	484,473	752,100	1,236,573	13
Arkansas	7	462,363	431,363	893,726	6
California	21	2,288,622	2,365,193	4,653,815	15
Colorado	1	364,493	416,507	781,000	9
Connecticut	2	170,000	170,000	340,000	0
Delaware	No program submitted for fiscal 1950				1
Dist. of Col.	No program submitted for fiscal 1950				0
Florida	5	756,750	756,250	1,513,000	3
Georgia	6	999,510	895,510	1,895,020	5
Idaho	No program submitted for fiscal 1950				24
Illinois	6	4,293,960	2,062,300	6,356,260	8
Indiana	11	980,000	970,000	1,950,000	4
Iowa	13	648,780	633,780	1,282,560	18
Kansas	15	571,325	506,275	1,077,600	10
Kentucky	6	448,000	418,000	866,000	1
Louisiana	10	709,100	695,350	1,404,450	9
Maine	No program submitted for fiscal 1950				1
Maryland	2	530,000	530,000	1,060,000	3
Massachusetts	5	804,000	804,000	1,608,000	2
Michigan	7	1,771,836	1,249,000	3,020,836	6
Minnesota	12	1,182,000	1,077,000	2,259,000	12
Mississippi	No program submitted for fiscal 1950				4
Missouri	7	684,527	664,527	1,349,054	8
Montana	No program submitted for fiscal 1950				4
Nebraska	31	665,126	561,299	1,226,425	10
Nevada	No program submitted for fiscal 1950				2
New Hampshire	No program submitted for fiscal 1950				3
New Jersey	3	585,000	585,000	1,170,000	1
New Mexico	No program submitted for fiscal 1950				1
New York	10	2,684,000	2,650,000	5,334,000	6
North Carolina	5	181,575	143,575	325,150	1
North Dakota	No program submitted for fiscal 1950				2
Ohio	10	1,212,500	881,000	2,093,500	1
Oklahoma	19	535,060	544,359	1,079,419	11
Oregon	3	349,942	444,381	794,323	4
Pennsylvania	8	6,199,507	2,004,110	8,203,617	5
Rhode Island	1	570,000	550,000	1,120,000	0
South Carolina	1	179,000	171,000	350,000	1
South Dakota	7	140,144	155,685	295,829	1
Tennessee	5	547,375	536,125	1,083,500	6
Texas	25	1,992,380	1,738,780	3,731,160	29
Utah	5	236,770	376,607	613,377	10
Vermont	3	57,500	57,500	115,000	2
Virgina	4	645,000	645,000	1,290,000	0
Washington	15	276,884	278,316	555,200	8
West Virginia	3	351,500	345,000	696,500	3
Wisconsin	10	929,500	826,500	1,756,000	6
Wyoming	No program submitted for fiscal 1950				0
Alaska	*	*	*	*	*
Hawaii	2	229,000	229,000	458,000	1
Puerto Rico	1	200,000	200,000	400,000	0
Virgin Islands	2	32,750	99,875	132,625	**
Totals	**314**	**$37,432,752**	**$29,840,767**	**$67,273,519**	**284**

* Alaskan sponsors at present can not accept federal-aid due to lack of such authority by the territorial government.

** No program during period.

K. C. Airport Makes Money Without Gouging Airlines

An airport can pay its own way without levying high charges at its airline tenants, says Louis R. Inwood, director of aviation, Kansas City, who proves it by showing an excess of $62,920.23 revenue over expenditures for the fiscal year 1948-1949; sufficient to take care of all airport costs, including interest on previous bond issues now outstanding and still show a small profit.

Inwood

This surplus is noteworthy especially in view of the fact that the Aviation Department, created only two and one-half years ago, has absorbed costs not previously charged to the airport, has reduced landing fees, and has shown two consecutive annual profits.

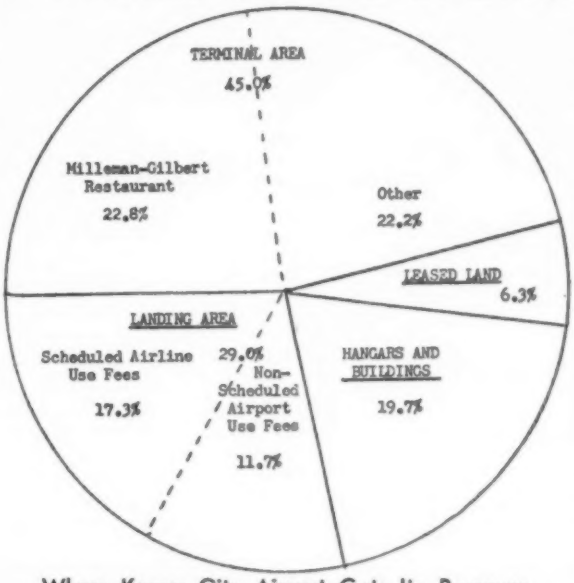
During fiscal 1947-1948, the department showed a surplus of $28,849.78 of revenue excess over expenditures. During fiscal 1948-1949, despite cost-of-living and regular salary increases and the assumption of $22,000 of maintenance costs previously carried under the Public Works Department budget, the aviation department showed an excess of $62,920.23 of revenue over expenditures.

Furthermore, Inwood says, Kansas City was possibly the only metropolitan airport in the country that actually reduced rates and charges to airlines and fixed-base operators last year, renegotiating landing fees to a figure 22.5% below the contract figure.

Revenue From Airlines. The revenue obtained from the scheduled airlines for use of the landing area amounted to 17.6c per enplaning passenger for the fiscal year, while use fees from other operators amounted to approximately 12c per enplaning airline passenger.

The terminal area yielded a total of 49c per enplaning passenger, with much of this coming from expenditures by sightseers and other visitors to the airport. The Milleman-Gilbert Restaurant, enlarged during the year by 60 seats, accounted for 22.8c of revenue per enplaning passenger, and the new pay auto parking lot brought in about 3.3c per enplaning airline passenger.

While pleased with results to date, Inwood feels that the present basis of airline charges is antiquated and should be revised "to accomplish more adequate proration of the costs of maintenance and operation of the landing area." He thinks it entirely possible that the proposed revision "will not necessarily result in a higher cost, but rather a system under which both landlord and tenant can more clearly foresee the future and exercise better and more efficient business planning."



Where Kansas City Airport Gets Its Revenues

Here's How. Recommendations of the Aviation Department to the City Council include the following:

1. That an aviation reserve fund be set aside from surplus aviation revenues in order to insure contractual obligations of maintaining the two city airports in usable condition and to prevent embarrassment of the city budget in future years.

2. That the Aviation Department be given the status of a public utility similar to that of the Water Department, so as to make possible improvements in management efficiency and also greatly improved marketability of revenue bonds already authorized.

3. That an attorney from the legal staff of the City Counselor be assigned full time to the Aviation Department, so as to afford better protection to the city in the drafting of the many contracts and leases which the department negotiates.

Inwood points out that the number of airline passengers using Kansas City Municipal Airport rose from 77,932 in 1939 to 751,241 in 1948 and is still growing. He feels that the airport revenues can be made to grow, too, through careful planning and efficient management.

One step already has been taken to boost revenues, this being a renegotiation of leases for space occupied by the Federal government at the airport. All such space formerly had been occupied on the basis of $1.00 per year.

Under the new contracts, space occupied by services essential to the welfare of the airport, such as the Weather Bureau and CAA traffic control, are paid for at the rate of $0.70 per square foot per annum, while other Federal space is being paid for at the rate of $1.95 per sq. ft. per annum ($0.70 per sq. ft. for service plus $1.25 per sq. ft. for space rental.

Airport Notes

Opening of a section of the $17,000,000 Eastshore Freeway puts **the Oakland Airport** within 15 minutes driving time of downtown Oakland and within 30 minutes of downtown San Francisco. When the remainder of the Freeway is opened next year the time between Oakland and the airport should be cut to 12 minutes.

The possibility of ending an **airport inadequacy at St. Louis** by construction of a second major field close downtown on the east side of the Mississippi is under intensive study.

A committee appointed by Mayor Darst has invited Eastern Air Lines, American, TWA, Chicago and Southern and Mid-Continent to send representatives to inspect the area and make recommendations as to a possible East Side airport site.

Leigh Fisher & Associates of Detroit has been awarded a contract by the Reading, Pa., city council to make an economic study and outline for a master plan at the **Reading Municipal Airport.**

Phoenix has $5.5 million available for expansion of **Sky Harbor Municipal Airport.** Construction program includes a $750,000 terminal building, a 1,000-car parking area, new hangars, a new 5,500-ft. runway, and rebuilding and strengthening of the original 6,000-ft east-west runway.

The Pennsylvania R. R. is again fighting Toledo's plan for expansion of its municipal airport, which will entail relocation of Pennsy tracks.

Unused hangar space at many airports in the midwest will be used for storage of a portion of this year's record wheat crop.

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Powerful Push—Providing 12,000 lbs. drawbar pull, which can be maintained at three mph, the Walter tug model FZMA, is an all-purpose tractor for use in moving airplanes, plowing snow and similar airport chores. The FZMA features four point positive drive; a 125 hp engine; extra large, low pressure tires and a turning radius of 18 ft. made possible by a 90 in. wheelbase. It is equipped with a ballast and equipment box.

Airport Executives Name Committee Chairmen

Committees for the American Association of Airport Executives have been announced by president Don W. Martin, manager of the Wilmington, Del., Airport. Committee chairmen will serve until July 1, 1950.

Purpose of the group is to elevate the standards of airport administration and promote cooperation among all persons engaged in airport management. Committee chairmen and co-chairmen are:

International—Wayne Parks, Beaumont, Tex., and Victor Dallin, Philadelphia, Pa.

U. S. Government—G. Pat Moore, Ft. Worth, Tex., and A. H. Near, Louisville, Ky.

State Government—Walter Betsworth, Waterloo, Ia., and A. E. Thomas, Des Moines, Ia.

Legal—Hugh Dobbs, Chicago, Ill., and Dr. John Frederick, Baltimore, Md.

Engineering and Architectural—Cecil Meadows, Bakersfield, Cal., and Hervey Law, New York, N. Y.

Use Charges—Peter Powell, Lexington, Ky., and Robert Aldrich, Minneapolis-St. Paul.

Airport Operations—David Leigh, St. Louis, Miss., and D. O. Langstaff, New Orleans, La.

Sales and Services Operators—Emory Boelson, Evansville, Ind., and Neil Brackstone, Lansing, Mich.

Airport Public Relations and Education—Fred Alley, Charlestown, W. Va., and Don Swenson, Rochester, Minn.

Membership—Homer Hoskins, Pontiac, Mich., and John Randolph, Hopkins, Minn.

Publications—Fred Hidinger, Cedar Rapids, Ia., and Francis Geng, St. Paul, Minn.

Association Public Relations—Robert Schott, Chicago, Ill., and Robert Blatt, airport editor of **American Aviation.**

Association Publicity—Francis Fox, Worcester, Mass., and Robert Neblett, Jackson, Mich.

Strategic Information—G. Pat Moore, Ft. Worth, Mich., and Bennett Griffin, Washington, D. C.

Service Liaison—C. G. Burnett, Detroit, Mich., William Lyons, Norfolk, Va., and Vincent Carson, New York, N. Y.

State Aviation Liaison—C. Cornish, Indianapolis, Ind., and L. Schroeder, St. Paul, Minn.

Regional directors of the association have been appointed temporarily by Martin. They are: region 1, Fred C. Alley; region 2, Harold Doty; region 3, F J. Bolton; region 4, Wayne Parks; region 5, Frank Hidinger; region 6, Cecil Meadows; region 7, Earl S. Bigler.

Manager for the 1950 convention will be F. J. Bolton, airport manager of Columbus, O. However, no date has been set.

Federal-Aid Airport Grants

Federal-aid airport grant offers totaling $540,263 were made by the Civil Aeronautics Administration during the two weeks ended July 15 to 28 communities, as follows: (Class of airport in parentheses)

California: Sacramento Municipal (5), $11,798; San Diego, Gibbs Mun. (2), $10,664; and Yuba City Airport (2), $28,348.

Colorado: Gunnison City Airport (3), $64,600.

Idaho: Buhn Mun. (1), $8,115.

Iowa: Denison Mun. (1), $7,800.

Kansas: Osawatomie-Paoli Mun. (2), $28,000.

Michigan: Kalamazoo Mun. (3), $62,000.

Minnesota: Dodge Center Mun. (1), $17,000; Flying Cloud Airport, Minneapolis (2), $15,000.

Missouri: Dexter Mun. (3), $23,900.

Montana: Choteau Airport (1), $10,000; Forsyth Airport (1), $14,293; and Superior Airport (2), $6,674.

New Mexico: Clovis Mun. (3), $20,456.

North Dakota: Carrington Mun. (2), $5,600, and Parshall Mun. (1), $4,200.

Oklahoma: Ada Mun. (4), $15,858; Enid Mun. (5), $26,430; Guthrie Mun. (3), $7,164; Lawton Mun. (4), $5,500; Max Westheimer Field, Norman (5), $8,000; and Lake Carl Blackwell Airport, Stillwater (1), $12,902.

Tennessee: Cookeville, Putnam Co. Airport (1), $12,000; and McKeller Field, Jackson (3), $50,000.

Texas: Gladewater Mun. (1), $27,977.

Washington: Paine Field, Everett (5), $29,205.

These boosted total Federal-aid grant offers through July 15 to 859 and the Federal funds involved to $84,364,516.

PRETESTED IDEAS

Baseball Scoreboard

UNITED AIR LINES keeps their baseball fan air travelers advised of the latest scores by mounting a scoreboard beside their flight arrival and departure board in the terminal building at Logan Airport, Boston, Mass.

In addition to illustrating the scoreboard, this picture shows another new and clever idea used on the Arrival and Departure Board. The flight number, arrival and departure time numerals as well as the names of the cities of the flight origin and destination are made with easily removable and changeable numerals and letters which are stuck to the board like Scotch Tape. They are known as "Quik Signs" and are made by the manufacturing division of E. W. Wiggins Airways, Inc., of Norwood, Mass.

ILS Interference Reduced

A STEEL OR IRON FENCE across the instrument runway approach zone usually interferes with the proper operation of the ILS (Instrument Landing System). When the Westchester County Airport at White Plains, N. Y., was completely enclosed by a 22,000 ft. long, 7 ft. high all-steel wire fence, a wooden (picket type) section of fence—1200 ft. long and 6 ft. high was installed in the Instrument Runway Approach zone to eliminate the possibility of the ILS interference.

Home Made Strip Lights

HERE IS an excellent example of the ingenuity of some operators and managers in converting "local materials" into useful equipment for their airports until they are able to procure standard and permanent equipment. In the meantime it serves their purpose and "keeps 'em flying."

Rather than rush out to the field to park cars around the landing strip for headlights to enable pilots to land safely after dark, Louis Mancuso, manager-owner of the Deer Park Airport, Long Island, N. Y., adapted some peach baskets, fruit jars, Christmas tree lights and surplus cable into a workable set of strip and obstruction lights.

Each light consists of a weatherproof rubber-enclosed, medium base "pig tail" lamp socket fitted tightly into a hole cut in the metal screw cover of a standard pint fruit jar. The jar is set on top of a peach basket which is painted white to serve also as a strip marker. No. 14 duplex rubber jacket weatherproof wire is used and all connections and splices are made inside the basket (above ground) to avoid grounding and moisture difficulties.

Ten watt inside frosted lamps are used in the units along the strip spaced on 300 ft. centers. Two units having 25 watt lamps are mounted as obstruction lights in each approach zone of the strip on 36 ft. high masts at one end and on the poles of a power line at the other end of the strip.

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SIKORSKY Helicopter NEWS

BRIDGEPORT CONNECTICUT

When you want to build a superior product, you must spend time, effort and dollars - and have the finest in tools and facilities.

Here at Sikorsky Aircraft, leadership in the design, production and world-wide use of helicopters is a direct result of painstaking research, engineering, testing and production - with the finest and most modern facilities available.

A most recent and outstanding example is our rotor blade test stand. Designed by our engineers and built to our specifications, the three-story structure is capable of handling blades sweeping as much as 90 feet in diameter. On it, aided by electronics, our test engineers can study new designs of rotor heads and blades that will provide even better performance in tomorrow's helicopters.

Pioneering and developing such facilities runs into hundreds of thousands of dollars. But it explains, in part, why a Sikorsky helicopter was the first in this country to fly successfully, why Sikorsky helicopters were the only helicopters that went to war, why they hold all seven international major helicopter records and why they are known the world over for their ruggedness and dependability.

SIKORSKY AIRCRAFT

Bridgeport, Connecticut

Skytours Plan Promotes Local Lightplane Business

Air-minded resort owners and pleasure-seeking personal aircraft owners are getting together on a nationwide basis to bring two new words into travel and aviation vocabularies—'airtels' and 'skytourists'—which also mean new business to local operators in vacation areas.

Wood

The skytourist using his airplane to by-pass the crowded popular resorts, is finding a warm welcome from members of a national chain of fly-in hotels and resorts familiar with the needs of the private flyer.

Clearing house for the skytourist is Skytours, Inc., Box 120, Swarthmore, Pa. President of the organization is Everett J. Wood who, with his son Arthur, has devoted three years, including 1500 hours in his Piper Cruiser, to promoting the utility of the private airplane as an access to pleasure rather than as an end in itself.

Skytours surveys the United States, Canada and Mexico for interesting places that can be reached by air and selects those which offer the best facilities for vacationing fliers. Bulletins containing this information are distributed to members of the organization, who enjoy special courtesies and rate discounts at the airtels.

The bulletins offer a wealth of detail for the vacationer-pilot, listing the features of the resort, recreations, accommodations and rates, plus technical data on the airport and its facilities.

Skytours has developed the resort program along two general lines—urging resort owners to build flight strips on or adjacent to their resorts, and tying resorts in with nearby established local operators. This latter arrangement means added revenues to the operator through hangar rentals, tie-down fees, servicing and repairs.

The resort managers have a personal interest in the welfare of the private flier, many being pilots themselves. Typical of these men is Rocco Bunino, owner of Sunset Villa at Lake Susquehanna, Blairstown, N. J., who is chairman of the board of Skytours Air Resorts, a division of Skytours, Inc. Bunino has been a pilot for 20 years and is a charter member of the New Jersey Aviation Trades Association.

Other directors are Col. Jack Lapham, owner of Flying L Ranch, Bandera, Tex.; C. M. Washburn, Honeymoon Island, Dunedin, Fla.; Tom Wheeler, Gray Rocks Inn, San Jovite, P. Q., Canada; Jerome Bates, Sky Lodge, Jackman, Me.; and Arthur M. Otis, Lake Sisse-Bak-Wet, Grand Rapids, Minn.

That the skytourist represents a good market for the resorts is attested to by one skytel operator, 90% of whose business arrives on his airstrip.

The number of air resorts is growing rapidly, increasing from 17 to 30 since May 1. The network literally stretches from Maine to California and from Florida to Oregon. Following is the current roster of Skytours Air Resorts:

California: C. A. Scholl, Furnace Creek Inn, Death Valley, Furnace Creek; K. D. Matholt, Rancho Carmelo, Monterey; Don B. Burger, Ojai Valley Inn, Ojai; Syd Furze, Warner Springs Guest Ranch, Warner Springs.

Connecticut: Frank E. Nagle, Air Holiday Inn, Groton Trumbull Airport, Groton.

Florida: Claus Senghaas, Rod & Gun Club, Everglades; John S. Packard, Royal Park Inn, Vero Beach.

Georgia: J. B. Temple, General Oglethorpe Hotel, Wilmington Island, Savannah; Gadi Timbes, King and Prince Hotel, St. Simons Island.

Idaho: John D. Bradley, Bradley Skytel, Bradley Field, Box 829, Boise.

Maine: Jerome B. Bates, Sky Lodge, Jackman.

Michigan: Edward Dreier, Blaney Park, Blaney Park; S. E. Paulus, Waukazoo Inn, Holland.

Minnesota: Arthur R. Otis, Otis Lodge, Sugar Lake, Grand Rapids.

New Hampshire: Mrs. Edward J. McKenzie, McKenzie's Inn, Franconia.

New Jersey: Rocco B. Bunino, Rocco's Villa Sunset, Lake Susquehanna, Blairstown.

North Carolina: Gladys L. Clemons, Woodfields Inn, Flat Rock; Mrs. Lucille S. Purser, The Carolinian Hotel, Nags Head.

Oregon: John Osburn, Hotel Gearhart, Gearhart; E. M. Madsen, Currier's Village, Lakeside; J. G. Sanderson, "Red's" Wallowa Ranch, 219 Morgan Building, Portland.

Pennsylvania: Joseph Gassler, Hershey Hotel, Hershey.

Texas: Col. Jack Lapham, Flying L. Ranch, Bandera.

Vermont: Florence E. Rath, The Worthy Inn, Manchester.

Wisconsin: Herb Field, Big Boulder Lodge, Boulder Junction; B. Kelly, Dell View Hotel, Lake Delton; John J. Garber, King's Gateway Hotel, Land O'Lakes; Mr. and Mrs. Eiel H. Myrland, Myrland Farms Sky Lodge, Montello.

Canada: Tom Wheeler, Gray Rocks Inn, St. Jovite Station, Quebec.

Tricycle Gear Unit—Four to six hours is all the time necessary to install this assembly which is approved on 65 hp Continental powered Cubs and the PA-11, 65 through 90 hp. Users claim better visibility and ground handling as well as safer operation of the plane landing and taking off in high winds. There is no welding or structural change necessary, with the exception of a slight modification on the exhaust tail pipe on the PA-11. The gear is handled by Smyer Aircraft Sales and Service, Ponca City, Okla. List price is $260.

Parks College to Start Channel Wing Research

Within 30 days Parks College of Aeronautical Technology will start a research program into the design and operation of the Custer channel wing airplane, a radical aircraft configuration. An agreement has been signed by the college with W. R. Custer, designer of the aircraft and F. D. Kelley, pilot. With students taking an active part in the program, the Aircraft Maintenance Engineering laboratory at Parks College will build the airplane.

The Custer channel wing airplane features pusher type propellers mounted at the rear of wings which take the form of barrel halves. The design is such that the propeller draws air over the wing surface creating adequate lift for flight without any appreciable forward movement of the aircraft. In the original design tested at Batesville, Md., this airplane would land and take off in very short distances. Certain experimentation since then leads the designer to feel the aircraft can be built to land and take off from a fixed spot. It will not rise vertically.

Lightplane Fleet Costs Reported by U. of Illinois

Operation of a fleet of 32 lightplanes for a period of 11 months and close observation of all costs involved has enabled the University of Illinois' Institute of Aviation to publish a comprehensive cost report that should prove quite valuable to local operators and personal plane users. The period of observation was from Feb. 1, 1948, to Jan. 1, 1949; the planes used ranged from 65 hp to 220 hp, and each plane weighed under 3,200 lbs. gross. Results are published in a bulletin called 'Light Aircraft Operating Costs,' by Dr. Leslie A. Bryan, who directed the project. (See table below.)

Method of computing depreciation of the planes used was the straight flight hour basis. Two-place trainers were depreciated at $1.00/flight-hour, the Piper PA-12 at $2.00, the Stinson 150 and Seabee RC-3 at $3.00, and the Boeings and the Beechcraft at $4.00. The rate on the two Beech A35's has subsequently gone up due to higher purchase price and more radio equipment in the plane.

Standard procedure for operation of University planes calls for cruising at 100 rpm's less than the manual recommends and immediate cut-back of the throttle on take-off when air-borne. When an operation is large enough and there is high utilization this would mean considerable savings on gas over a period of time. Gas was bought at bid prices, which saved a few cents per gallon, and all gas used was 80 octane.

Airplane maintenance costs shown in the chart cover all labor and material for accident repairs, overhauls and rebuilding of airframes. Labor cost about $1.31/hr., and materials were bought for about 10-20% less than retail price, but Dr. Bryan says these savings were offset by a more rigid inspection system than the CAR calls for. During the time of the survey they had one mechanic for every four planes, and men were on duty 24 hrs. a day, seven days a week. About 2/3 of their time was spent on University planes and the rest of transient. Lineman's salaries per flight hour on University aircraft amounted to 54c.

The University acts as self-insurer of its own fleet except in the case of public liability and property damage. The policy protecting them for claims up to $50,000/person $250,000/accident, and $50,000 property damage cost them 9.1c per flight hour.

TEMCO Tests Civil Version Of Military Trainer

An experimental project is now under way at Texas Engineering and Manufacturing Co., Dallas, Tex., in which a commercial version of the tandem-type military trainer, equipped with a 145 hp. Continental engine is undergoing flight tests.

Originally TEMCO marketed the two place side-by-side executive Swift plane with a 125 hp. engine at $4,495. This was followed by the military version of the Swift with the 145 hp. engine and a cruising speed of 150 mph and now testing will determine the advantages to be gained from using the higher horse power and new cabin arrangement in a commercial plane.

Indications are that such a plane, if test results and a market survey verify the need for it, would cost about $6,000. Earliest possible production date would be in 1950.

Michigan's Flying Farmers Merge Two Groups

Michigan's two flying farmer organizations became one August 11 when representatives of Michigan Flying Farmers and Michigan Flying Farmers United met at Capitol City Airport, Lansing, to effect a merger.

The latter club was affiliated with a four-state group called Flying Farmers of Prairie Farmer Land; both were members of the national organization. The consolidation gives the merged club, Michigan Flying Farmers, a total membership of about 500, all of whom are still members of the national organization and the four-state group.

Type	NC No.	Total Hours Flown	Fuel Used		Fuel Cost Per Hour		Oil Used		Oil Cost Per Hour		Direct Maintenance			Total Operating Costs Per Hour
			Gallons	Cost	Gallons	Cost	Quarts	Cost	Quarts	Cost	Material	Labor	Total Per Hour	
Cessna 140	2301V	542.2	2960.7	$ 595.61	5.46	$1.098	121	$ 15.73	.223	$ .029	$ 365.50	$ 205.23	$ 1.05	$ 5.187
Cessna 140	2324V	608.0	3308.6	667.98	5.44	1.098	136	17.68	.224	.029	292.33	401.75	1.14	5.277
Piper Supercruiser PA-12	4185M	447.1	2373.3	477.21	5.31	1.067	116	15.08	.259	.034	128.39	355.86	1.08	6.191
Beech A35	752B	38.4	281.1	50.59	7.32	1.317	14	1.82	.365	.046	60.24	23.70	2.19	9.563
Beech A35	720B	117.6	1143.0	240.17	9.72	2.042	29	3.77	.246	.032	12.75	20.00	.28	8.364
Beech 35	80460	343.2	3090.6	659.40	9.00	1.921	106	14.08	.309	.041	885.33[1]	419.95	3.81	11.782
Stinson 150	97692	455.8	3973.8	735.00	8.72	1.612	258	33.54	.566	.074	1025.65[3]	469.73	3.28	9.076
Aeronca 7AC	82993	638.1	2196.2	403.84	3.44	.632	131	17.33	.203	.025	800.06[3]	632.13	2.24	5.907
Aeronca 7AC	82994	712.3	2760.4	514.67	3.88	.722	126	16.38	.177	.023	223.24	333.61	.78	4.535
Aeronca 7AC	82995	685.7	2467.6	511.50	3.60	.745	145	18.85	.212	.028	269.12	369.98	.93	4.713
Aeronca 7AC	82996	600.8	2315.8	425.87	3.85	.708	136	17.68	.226	.029	922.79[3,4]	823.70	2.91	6.657
Aeronca 7AC	82997	734.3	2674.5	493.11	3.64	.671	140	19.20	.192	.026	526.45	354.40	1.21	4.917
Aeronca 7AC	83427	690.6	2504.4	464.02	3.63	.671	131	17.03	.189	.025	212.50	345.23	.81	4.516
Aeronca 7AC	83428	678.0	2417.6	452.06	3.57	.666	139	18.07	.205	.027	556.88	324.69	1.30	5.003
Aeronca 7AC	83429	634.0	2362.5	444.72	3.73	.701	125	16.25	.197	.026	420.81	429.61	1.34	5.077
Aeronca 7AC	83430	728.0	2626.8	489.03	3.61	.671	154	20.02	.212	.028	515.59	389.90	1.24	4.949
Aeronca 7AC	83431	587.6	2094.0	381.99	3.56	.650	108	14.04	.184	.024	784.76[3]	701.66	2.53	6.214
Aeronca 7AC	1536E	725.6	2629.2	491.03	3.62	.676	148	19.12	.202	.026	576.56	562.32	1.57	5.282
Aeronca 7AC	1537E	531.5	2117.5	395.46	3.98	.744	100	13.00	.188	.025	1124.39[3,4]	695.84	3.43	7.209
Aeronca 7AC	1538E	745.1	2645.7	501.95	3.55	.673	151	19.89	.201	.027	473.54	573.04	1.41	5.129
Aeronca 7AC	1539E	875.0	3142.3	581.76	3.59	.664	176	22.88	.201	.026	878.90[3]	772.78	1.89	5.190
Aeronca 7AC	1540E	921.8	3174.4	587.80	3.44	.637	189	24.57	.202	.027	439.31	379.00	.89	4.164
Aeronca 7AC	1541E	700.8	2683.0	501.14	3.83	.715	163	21.19	.233	.030	839.98[3]	755.62	2.28	6.135
Cessna 120	89546	640.0	2314.3	421.42	3.61	.657	138	17.94	.216	.028	318.45	499.09	1.28	4.775
Cessna 120	89623	590.5	2042.1	354.41	3.46	.600	122	15.86	.207	.027	292.07	333.87	1.06	4.497
Ercoupe 415-C	86979	238.3	783.6	156.75	3.31	.660	46	5.98	.193	.025	407.80	414.48	3.44	8.135
Ercoupe 415-C	99272	255.3	976.1	174.67	3.83	.685	68	8.84	.267	.035	675.67	396.91	4.22	8.950
Seabee RC-3	6717K	24.0	411.6	71.45	17.10	2.977	8	1.04	.333	.043	35.53	29.37	2.70	10.830
Boeing A75N1	51443	442.1	4899.5	879.36	11.05	1.989	291	37.83	.659	.085	119.37	505.24	1.41	9.994
Boeing A75N1	57843	431.6	4613.6	830.37	10.69	1.923	332	43.16	.771	.100	135.15	321.38	1.06	9.093
Boeing A75N1	64078	129.1	1579.3	283.10	12.09	2.192	147	19.11	1.140	.148	318.64	154.08	3.66	12.310
Taylorcraft BC-65	27460	105.7	325.0	57.99	3.06	.547	18	2.34	.170	.022	101.46	79.06	1.70	5.379
TOTALS		16,598.1	75,888.1	$14,295.43			4,212	$549.30			$14,739.21	$13,073.21		

[1] Includes new propeller blades. [2] Includes complete engine rebuilding. [3] Includes complete rebuilding of airframe and major engine overhaul. [4] Includes cost of accident repairs. NOTE: Total operating cost per hour is figured on the basis of shop overhead maintenance at $1.14/hr., depreciation of shop equipment at $0.16/hr., damage at $0.08/hr., public liability at $0.09/hr., lineman's salaries at $0.54/hr., and depreciation.

Air Laundry— A regular air pick-up laundry and cleaning service is operated out of Stapleton Airfield, Denver, by James Pyle, manager of the Denver Air Terminal Corp. He flies his Cub around his route once a week, covering the ranch country of Colorado. Most of his customers are pilots and airline personnel, a group usually plagued with laundry problems.

Fixed-Base Briefs

Brayton Flying Service, Lambert-St. Louis Municipal Airport, has announced that in the future women may enroll in any of its training departments. They had previously been limited to enrollment in the flight training course.

Walter St. John, formerly sales manager for Piper Aircraft Corp. and the personal plane division of Fairchild, has been made general sales manager of the aircraft section of **Aeronca.**

William R. Waldeisen, president of Williamsport Narrow Fabrics Co. and chairman of the Williamsport Airport Authority, Williamsport, Pa., has been elected a director of **All American Airways.**

Harvey Martin, Piper distributor at Long Beach, Calif. since 1934, has sold **Martin Aircraft Sales** to **John Baker,** former regional sales representative for Piper Aircraft Corp., and **Al Gillis,** Piper and Stinson distributor for Montana. Baker will manage the organization which will continue to operate as Martin Aircraft Sales.

Bell Helicopters, Inc., of Los Angeles, has been awarded a year's contract to patrol the 2,500-mile Bonneville, Wash., power system. Contract calls for a minimum of 600 hours of flight operation. Base for the operation will be Yakima, and the Bell helicopter will be all-equipped for winter use.

New Radio Charts: The Coast and Geodetic Survey has published a new series of 59 standard radio facility charts covering the U. S. The charts are at a uniform scale of 1:200,000 and are printed in black and green on white paper of standard page size. Included on the maps are civil airways, air traffic control limits, mileages between radio fixes, isogonic lines and shoreline, radio facilities and minimum safe altitudes. Copies are available at 5c each from the Coast and Geodetic Survey, Dept. of Commerce, Washington, 25, D. C.

Aviation Sales and Service

By Robert C. Blatt

Birds on the Landing Strips: We have received a number of requests from operators and managers of both large and small airports who are plagued by birds that insist on occupying the landing strips and runways, as to ways and means of getting rid of them. Several weeks ago we asked for suggestions to help solve this serious problem—and it *is* serious at a number of fields, especially those located near large bodies of water.

Frank B. Brady, of the operations division of ATA came to our rescue with the following ideas which he dug out of his "bird" file. A number of methods have been tried by various services and agencies to rid a particular area of birds. Sonic and supersonic generators have been tried experimentally. The results apparently have been unsuccessful because of the limited range of the equipment. Judicious use of firearms appears to cause the birds to be less inclined to return to the area. Frequent movement of a vehicle through the area has an effect similar to that of firearms.

Spraying repellents on the runway surface has been considered but has been found to have a corrosive effect on aircraft tires. A "birth control" program has been tried by the Fish and Wild Life Service of the Department of Interior, which consists of spraying the eggs of the seagulls with a penetrating oil that kills the fertile egg. The gulls go on attempting to hatch the eggs and by the time they realize they have been tricked, it is too late to lay a new batch. This program has been used where seagulls are multiplying too rapidly under protection of the law.

An "exploder" was used by the Natural History Museum to frighten blackbirds and starlings from buildings. ATA arranged to have one shipped to the Logan International Airport at Boston, Mass., where the gull problem was particularly serious. This test was not too satisfactory. After the novelty had worn off, gulls paid little attention to the device.

Aviation-Quality Service: *Sid Nesbitt, well-known president of the Atlantic Aviation Corp. at Teterboro, N. J., comes up with several new selling angles. Sid, in addition to being a Beechcraft and Bendix Aircraft Radio Distributor, also is a dealer in Bendix home radios and television receivers. Capitalizing on the generally recognized high quality of aviation and aircraft products, Sid advertises "Aircraft Quality Service" on his television receivers. The Atlantic Aviation mailing piece says: "The finest television sets work better with good installation, good service. Atlantic Aviation's radio technicians are used to installing and servicing the most intricate electronic equipment on Army, Navy and civilian aircraft. These master technicians can assure you of constantly perfect service of your Bendix Television and Home Radios."*

In addition, as a special get-acquainted offer, Sid offers each purchaser of a Bendix home radio or television set, three free airplane rides (all at one time) in a brand-new Beechcraft.

Used Plane Center: Duke Harbaugh, who took over the Perkins Airport one mile east of Sacramento, Calif. last spring, has started additional construction in the hangar area as a result of the expanding business of his "Used Plane Center." Harbaugh's airport is unique in that it is used solely for the purpose of selling used planes and that there are no flight instruction, repair or maintenance of planes or supply stores at the field. Harbaugh conceived the idea of establishing an airport where full attention could be given to the sale of used planes, which are left at the airport by their owners on a consignment basis, and he reports the venture far more successful than he had anticipated. He remodeled the airport's main building, constructed a line of individual T-hangars and oiled the plane display parking area.

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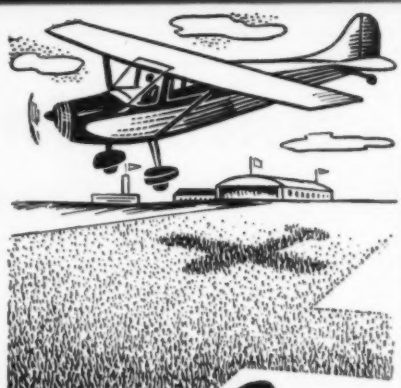

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LOCAL OPERATIONS

Lee Smith Forms Own Firm

Lee H. Smith, former domestic sales manager for Beech Aircraft Corp., has formed his own company, The Lee Smith Co., with offices at 6363 Wilshire Blvd., Los Angeles. The firm will serve as western states and Mexico factory representatives for National Aeronautical Corp., Ambler, Pa., makers of NARCO omni-radio equipment.

Five area distributors have been appointed: Pacific Aircraft Sales Co. at Burbank and Oakland, Calif.; Flightcraft, Inc., at Portland, Ore., and Seattle, Wash.; and Aircraft Radio Service at Phoenix, Ariz.

The company also has been named exclusive export representative of the Jimmie Mattern Co., Burbank, manufacturer of Mattern Course and Mileage Calculators and other navigation devices.

CATA Reorganizes

Dick Thurber, for the last two years director of California Aviation Trades Association, has opened an advertising and public relations office under the firm name of R. B. Thurber and Associates, at 1435 Flower St., Glendale, Calif.

CATA is reorganizing for a new plan of operation. It is dispensing with its staff, setting up activities on a voluntary basis and revitalizing its local chapter system.

First local chapter to be organized is Los Angeles, with Norman Nicholson of Pacific Airmotive Corp. as chairman and A. Biederman as secretary-treasurer. Under the new system, CATA hopes to be able to balance its budget and restore the paid staff the first of the year.

Lightplane Exports Down

Exports of four-place and under personal aircraft by nine companies reporting to the Aircraft Industries Association totaled 277 units with a value of $1,268,000 for the first six months of this year. Shipments for the first half of 1948 totaled 542 planes valued at $2,060,552. Brazil, with 54 planes valued at $266,905, was the best export customer in the first months of this year, while Argentina, with 210 units valued at $526,685, was in first place a year ago.

Trans-Atlantic by Beech

Two Italian pilots are planning shortly to fly the Atlantic non-stop from east to west in a Beech Bonanza. One of the pilots, Giovanni Brondello, has already taken delivery of the plane at Wichita.

He plans to fly it to Italy via Great Britain and France to pick up his co-pilot. Then they will proceed to Lisbon, Portugal, for take-off for New York.

Air Coach Survey Shows Heavy Traffic Diversion

By Eric Bramley

Although the five domestic airlines that have been operating air coach flights had taken in passenger revenues of almost $1,500,000 from the service during April-May, there was a surprisingly high percentage of diversion from their regular trips.

This was a conclusion that could be drawn from a Civil Aeronautics Board survey of air coach operations during April and May, 1949, plus an analysis of questionnaires that CAB had placed aboard both coach and regular airline flights. The present coach tariffs of the airlines expire Sept. 30, and the survey is expected to play a major part in helping CAB determine whether or not the services should be extended.

One of the airlines affected, Mid-Continent, without waiting for the Sept. 30 deadline, informed CAB this month that it wished to discontinue its air coach because it was not profitable enough to warrant continuation.

The survey showed that in April-May, the coach flights of Capital Airlines, Continental, Mid-Continent, Northwest and TWA brought in passenger revenues of $1,490,339. Revenue from excess baggage, express and freight amounted to $83,502, making total non-mail revenue of $1,573,841.

However, CAB received questionnaire answers from 6,730 coach passengers. Of this number, 5,069 said they would have made the trip anyway if coach service had not been available. Of the 6,730 total, 2,317 or 34.4% said they would have used regular-fare service.

What conclusions CAB will draw from the survey remains to be seen. However, those who have not been completely sold on the coach idea could, from the figures in the survey, bolster their contentions that the vast majority of coach passengers are not first-riders, and that the airlines are taking business away from their regular flights.

For example, of 3,723 Capital coach passengers queried during the two-week period, 1,199 or 32.2% said they would have traveled regular-fare plane. Of Continental's coach passengers, 45% would have used regular-fare plane; MCA, 44.1%; NWA, 34.9% and TWA 38.2%.

Applying these percentages against each airline's reported coach revenue passenger-miles would show that 12,964,761 passenger-miles out of a total 37,688,261, or 34.4%, would have been performed on regular schedules.

Even more impressive is a computation that takes these passenger-miles that would have been on regular-fare flights and multiplies them by each airline's normal passenger revenue per revenue passenger-mile. The answer is that, if air coach had not been available, these passenger-miles would have produced revenue of $763,774 at regular fare. This is 51% of the $1,490,370 total passenger coach revenue reported for the two months.

Valid? Air coach proponents, on the other hand, could point a finger at the validity of the answers received on the questionnaires. A passenger sitting aboard a coach flight, and enjoying his trip, would be inclined to stretch a point and say that he would have gone by air anyway if the coach hadn't been available, they claim, adding that this would be even more so with a first-rider. These proponents can also claim that there were 2,752 out of 5,069 persons who would have traveled rail coach, pullman, bus, auto, or more than one other means of transport if air coach hadn't been available.

And, as far as air coach's promotional value is concerned, it can be shown that of the 6,730 coach passengers queried, 1,405 or 20.9% were first-riders. This is twice as high as the 10.8% (3,256 out of 30,170) regular plane passengers who said they were first-riders.

All the pros and cons must be weighed by CAB in deciding whether to continue the service. But the fact remained that, assuming the validity of the questionnaire, diversion was higher than most people had realized.

Airline Convenience Wins In Pioneer Poll

Pioneer Air Lines claims that it is doing all right against the competition of the private automobile.

Recently the company distributed questionnaires to 5,000 passengers. Tabulated results showed that of this number, 40.44% asserted that they would have used private automobiles if PAL's service had not been available. This "forcibly illustrates how effectively Pioneer's services have met the problem which the (Civil Aeronautics) Board had anticipated; i.e., competition from the private automobile," the company said.

The questionnaire showed that 26.14% would have used another airline,

CAB Analysis of Scheduled Airlines' Sky-Coach Traffic

April-May, 1949

	Capital	Continental	Mid-Continent	Northwest	TWA
Passenger revenues					
Sky-coach	$612,167	$22,365	$28,989	$555,855	$270,994*
Other services	2,978,481	607,488	1,022,177	3,153,091	9,295,654*
%, coach of total	17	3.6	2.8	15	2.8
Passenger load factor					
Sky-coach	75.2	39.8	53.8	83.9	74.2
Other services	50.6	40.3	59.2	55.4	61.5
Revenue passenger-miles					
Sky-coach	15,469,700	558,761	724,734	14,149,226	6,785,840
Other services	50,533,273	10,709,239	17,287,174	54,283,617	160,466,160
%, coach of total	23.4	5	4	20.7	4.1
Pass. rev. per rev. pass.-mile (cents)					
Sky-coach	3.957c	4.003	4.000	3.929	3.994
Other services	5.894	5.673	5.913	5.809	5.793
Express, freight, excess baggage rev.					
Sky-coach	$32,635	$1,357	$2,366	$31,514	$21,586†
Other services	321,040	26,894	34,764	269,796	696,387†
%, coach of total	9.2	4.8	6.4	10.5	3

* includes excess baggage
† excludes excess baggage

Answers to CAB Air Coach Questionnaire

	Capital	Continental	Mid-Continent	Northwest	TWA	TOTAL
Coach passengers who said they would have made trip if coach had not been available (Out of 6,730 queried)	2,784	178	135	1,278	694	5,069
Would not have made trip	697	28	36	313	163	1,237
Don't know	242	12	6	98	66	424
% answering "yes"	74.8	81.7	76.3	75.7	75.2	75.3
If coach not available, would have used:						
Rail coach	757	11	14	186	103	1,071
Rail pullman	465	52	23	340	126	1,006
Bus	67	1	11	41	23	143
Auto	145	5	7	60	48	265
Regular-fare plane	1,199	96	78	589	353	2,317
More than one other means	151	11	2	62	41	267
% of 6,730 total who would have used regular-fare plane	32.2	45	44.1	34.9	38.2	34.4

24.02% the train, 10.72% the bus, 3.74% private plane, and 1.74% didn't answer.

Of the passengers queried, 70.62% were traveling on business, 21.36% for recreation, 6.5% on emergency, and 1.52% didn't answer. PAL found that 11.32% were making their first flight on a commercial airliner, and in addition, 15.6% had made their first commercial flight on PAL.

Asked what part of their travel was via airline, 28.14% answered less than one-fourth, 22% one-fourth to one-half, 12.04% half to three-quarters, 19.94% over three-quarters, and 17.78% didn't answer. Asked for annual number of flights made, 23.66% flew less than five times, 22.14% five to 10, 14.79% 10 to 20, 12.42% 20 to 30, 6.36% 30 to 40, and 6% didn't answer.

If PAL's service were discontinued, 67.48% said they would be individually inconvenienced, 35.2% said it would impair the efficiency of their business, 11.74% said it would place them and their organization at a competitive disadvantage, and 14.02% didn't answer. Of the 5,000 persons, 98.26% said that PAL should be permanently certificated. the company said.

Airline Traffic Survey For March, 1948, Released

The Civil Aeronautics Board's Airline Traffic Survey for the month of March, 1948, fourth in the semi-annual postwar series of surveys, is off the presses. Its five volumes include detailed traffic data covering scheduled domestic, territorial and international services of U. S. carriers.

Volumes 1-3 comprise the domestic and territorial origination-destination airline traffic survey, and like data for trans-border traffic. Volume 4 covers domestic and territorial station-to-station data by carriers and operating segments. Volume 5 comprises origination-destination and station-to-station data on all classes of international traffic.

The complete set may be purchased for $6.40 from the Supt. of Documents, Govt. Printing Office, Washington 25, D. C. Individual prices are: Volume 1, 40c; Volume 2, $1.75; Volume 3, $1.75; Volume 4, $1.00, and Volume 5, $1.50.

Stewards Become Agents

Monarch Air Lines expects to save $12,000 a year as a result of transferring all its flight stewards to the classification of flight passenger agents, with station operations added to usual flight duties. The number of flight stewards consequently was reduced from 15 to 10 covering the same number of flights daily. Savings also are made in reduction or elimination of per diem and layover expense.

Over the Counter

By Eric Bramley

Sales Promotion

NORTHWEST AIRLINES a few weeks back concluded a sales contest that was open to all employes not regularly identified with traffic and sales. And they uncovered some darned good salesmen—good enough, in fact, to produce $451,172 worth of business during the contest. Winner was **Robert B. Chernich,** a purser based at Minneapolis, who got enough points to win himself a television set plus other prizes. Among other top winners were a pilot, stewardess, treasury department accountant, schedule maker, and operations worker. By stations (on basis of total sales, not the ratio of number of employes to sales) the leaders were Minneapolis-St. Paul, Seattle, Washington, D.C., Fargo, Milwaukee, New York and Missoula. Top departmental standings: stations, stewardesses, pilots, treasury, maintenance base shops, publicity, flight control, personnel, general administration, executive and supervisory, operations, engineering and planning.

The advertising and sales promotion divisions of **American Airlines'** sales department have been combined into one division known as sales promotion and advertising, headed by **James Dearborn,** former advertising director. New division also has added functions of tie-in, merchandising and promotional programs. **C. A. Stevens Jr.,** former sales promotion director, and **Stanley Washburn,** who formerly handed tie-in and merchandising functions within the public relations department, have resigned to accept positions with other companies . . . **Capital Airlines'** advertising program in travel sections of metropolitan dailies is partly responsible for the fact that the company's travel agents produced $250,000 more in revenue for the airline during the first half of 1949 than in the same 1948 period. June revenue from travel agents comprised 12½c of each revenue dollar . . . **Braniff Airways** recently promoted what it says is the "largest chartered trip by air of American businessmen to a foreign country." It carried 250 Southland Life Insurance Co. salesmen and their wives from Dallas and Houston to Havana for Southland's annual convention. Five planes were used.

Tariffs and Services

CONTINENTAL AIR LINES is seeking CAB permission to make its family plan effective on all days of the week, instead of only Mondays, Tuesdays and Wednesdays . . . **National Airlines** has stated its intention to inaugurate the family plan over its system (including Havana) on Sept. 5. If approved it will mark the first time the plan has been used to and from Florida. **Eastern Air Lines** has indicated that it will request suspension of the NAL proposal. However, both Eastern and Delta are going to file family plan tariffs as protective measures . . .

Northwest Airlines on Aug. 1 opened first domestic Boeing Stratocruiser service, between Chicago and Twin Cities. Three round-trips daily are being operated, and later this month New York-Seattle service will be inaugurated . . . **Southwest Airways** will open service to its newly-certificated points of Paso Robles and Oroville as soon as necessary airport improvements are completed . . . **Resort Airlines,** recently certificated by CAB to fly to Latin American and Canadian resort areas, is now operating a "Race Track Special" daily with DC-3's between New York and Saratoga. Flight leaves LaGuardia at 11:30 a.m., arriving back at 8:15 p.m., with one-way fare $15, round-trip $25 . . . **Pan American Airways** on Aug. 1 reduced Latin American cargo rates, with some cuts as high as 50%. On a ton-mile basis, new rates range from 18 to 67c, depending on weight and destination, against old ones of 40 to 75c. Instead of only two weight classifications (under 100 lbs. and over 100 lbs.), PAA now has three: under 100 lbs., 100 to 3,300, and over 3,300.

Passenger Service

IT HAS BEEN SAID that when business isn't so good, the airlines treat the passengers like kings, but when business is rushing they start kicking people around. Interesting, therefore, to note that in the midst of the recent good business, **Capital Airlines** started a passenger service campaign among its employes. The approach was novel. Each employe received a copy of a letter written by a fictitious passenger on the letterhead of a fictitious corporation. The letter was addressed to **J. H. Carmichael,** president, explaining how the passenger had sworn off the airlines in 1946 because of the bad service, but had come back later. He said he understood that business was good now, but added: "If they can't handle volume business with dispatch and efficiency, if they can't treat me with courtesy and friendliness now that times are good, this time they're kissing me goodbye forever." Across the top, Carmichael penciled a note to personnel: "You can stop this letter being written. How about it?" **Eastern Air Lines** is also increasing emphasis on passenger service. Latest issue of company's house organ carries a full-page picture of "King Passenger," showing the kind of service he should receive.

P. A. System Pays-Off in Customer Service

By Fred Hunter

There's a new folksie atmosphere on the transcontinental airliners these days. It comes out of the cockpit over the public address system by which pilots now keep passengers informed of flight progress.

"The P.A. system is the best gimmick we ever put in our airplanes," declared Dick Fagin, western superintendent of flight for American Airlines. "It's wonderful! Why, pilots are getting fan mail now. Next thing you know autograph hunters will be showing up at the airports."

Not all pilots are accomplished elocutionists. A few, even, have "mike fright" so bad they can't be persuaded to try out their talents, if any, as public speakers, but in that case there's generally a co-pilot or flight engineer who can be counted upon to do a reasonably competent job.

But a surprisingly large percentage of the airlines' veteran pilots are taking to the P.A. microphones like a duck to water, and passenger response to their informal lessons in geography is proving almost 100% perfect.

W. A. Patterson, president of United Air Lines, cites examples to show how the public address system is making an important contribution to improved customer relations when the pilot applies a little thought to his transmissions.

When one engine in his DC-6 began running a little rough, a United captain decided to feather it. He was near the Grand Canyon at the time so before feathering he called the attention of the passengers to the spectacle. He turned the ship so that passengers were peering out the windows opposite from the side on which the rough engine was located. He suggested the passengers observe how the canyon's colors changed as he turned the plane toward the sun. Then in the same conversational tone of voice he advised the passengers the engine was acting a little rough and added he thought he would give it a little rest. The passengers devoting their full attention to the canyon didn't see the propeller being feathered and having had the operation so casually explained while they were focusing on the beauties of the spectacle were completely relaxed as the craft continued on its way on the three engines.

On another occasion a United captain told his passengers a little thunderstorm was ahead. "If we find it too rough, we'll get out of it," he said. A few minutes later the air became just a little choppy. "I guess we'll make a small detour," the pilot then said as he turned off course. After a short period he found smooth air and the plane load of passengers was as pleased as punch.

Bob Renz, who has accumulated 20,000 hours flying for American, represents an example of a veteran pilot who makes the P.A. system pay off for his company. After every trip Renz takes out between San Francisco and Dallas, American never fails to get at least one letter of commendation and frequently it gets several.

At the conclusion of a trip, Renz' final words over the microphone are on this order: "It has been a pleasure to have you aboard. We hope you enjoyed the flight and we look forward to having you travel with us often." Passengers leave the plane feeling that it was a pleasant flight and hoping that on their next trip Renz is the captain.

American gets out a handbook of suggestions for its pilots. But in the final analysis the success of the P.A. system depends upon the interest the pilot takes. The speakers, of course, are most effective on daytime schedules. The airlines don't turn 'em on in the middle of the night just to report the plane happens to be over Alburquerque. Snoozing passengers are permitted to keep right on snoozing.

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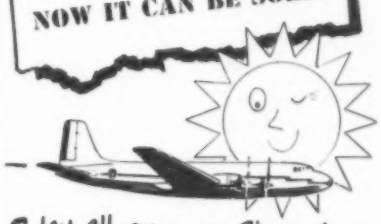

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...to get there faster, feeling fresher

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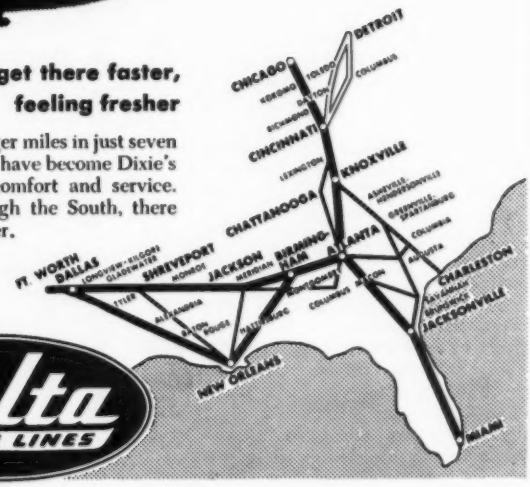
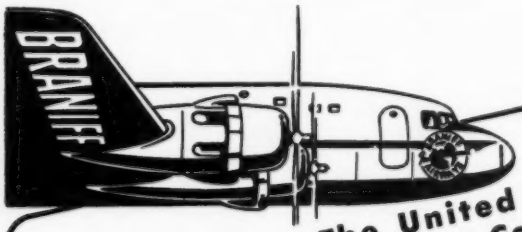


General Offices:
Atlanta, Ga.,

Delta AIR LINES



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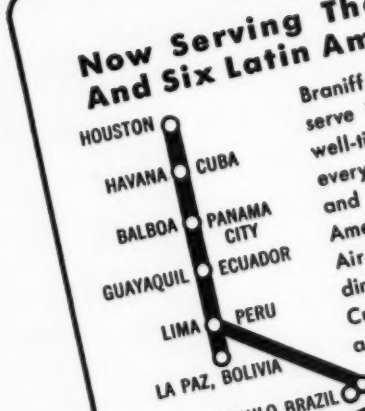
Braniff flights within the United States serve 32 Midwest cities and through well-timed connections link them with every major city in the United States and with Braniff's expanding South American system. Through the Houston Air-Gateway Braniff now provides direct, one-company service to and from Cuba, Panama, Ecuador, Peru, Bolivia and Brazil.



For information on travel or shipping call your Braniff office, local airline or travel agent.

BRANIFF International AIRWAYS

LOVE FIELD • DALLAS 19, TEXAS

TECHNICAL LITERATURE

Split-Core Probe: Pyramid Instrument Co., 49 Howard St., New York, N. Y., is distributing a four-page booklet describing the features and uses of its new pocket type Amprobe, a split-core volt-ammeter design which measures current without interrupting the circuit.

Fire-Retardant Coatings: National Bureau of Standards, U. S. Dept. of Commerce, Washington 25, D. C., has published technical report No. 1363, "Fire-Retardant Coatings for Aircraft," which gives the results of a joint research program with the Civil Aeronautics Administration on fabric fires in small aircraft. Coatings have been developed which approximately double the time interval between ignition and destruction of fabric by fire.

CAA Technical Reports: Civil Aeronautics Administration, Technical Development Service, Indianapolis, Ind., has recently issued Nos. 76, 82, 91 and 93 in the Technical Development Report series. Titles, respectively, are: "Development of Interior Painting and Lighting for CAA Facilities," "Development of Airport Control Tower Lighting," "Improvements in Glide Path Transmitters" and "Flight Tests of an Off-Schedule Distance Computer."

Subject Headings: Special Libraries Assn., 31 E. 10th St., New York 3, N. Y., has published a 256-page planographed list of subject headings encompassing aeronautical engineering and closely allied fields. Prepared by a group of outstanding technical librarians, the list is intended for aeronautical engineering literature rather than commercial aviation material, although the latter field has been given some consideration. Subdivisions are indicated where pertinent. Valuable for libraries with aeronautical or engineering material and companies maintaining aeronautical engineering files. Price: $4.00.

Jet Research: New York University College of Engineering, Bureau of Public Information, New York 53, N. Y., has published a four-page folder titled "Project Squid" that describes equipment and procedures developed and used in basic studies of pulse-jet engines by the research division of the College. Text explains the analysis of pulse-jet design for the translation of functional knowledge into theory. Aim of the project is to facilitate further development of this type jet engine and eliminate hazards and costly trial and error methods.

Folder contains photos of flame patterns and test equipment, including a full scale PJ-31 buzz bomb engine operated by the project at Westchester County Airport at Rye, N. Y.

Price of folder is 10c.

Eaton Publishes Supplement To Aviation Chronicle

A Chronicle of the Aviation Industry in America, 1947-1948 Supplement, covering the highlights in the aviation world during those two years, has been published by Eaton Manufacturing Co. Its predecessor, published last year, covered the industry from 1903-1947.

The supplement's first report is for November 23, 1947 and is complete through Dec. 31, 1948. Photographs of new military and commercial planes announced during the period are reproduced in this 16 page supplement, with a special page devoted to recently developed rotating wing aircraft.

The publication is a non-profit "salute to the aviation industry." Eaton Manufacturing Co. supplies metal products to aircraft and engine builders.

ACCESSORY OVERHAUL INDUSTRIES, INC.

announce their appointment as an Authorized Stromberg Service Station for the Bendix Products Division in the overhaul and test of Stromberg Direct Injection pumps, Master Controls and Injection Carburetors.

Work is accomplished by factory and airline trained mechanics and accompanied by CAA #337 forms. Replacement parts are purchased direct from manufacturers.

Work is charged on a flat rate price plus replacement parts.

Address: 130-41 91 Avenue, Richmond Hill 16, New York.

China Cessna Service

A fleet of six Cessna 195's is flying into cities never before visited by an airplane, delivering passengers, freight and mail to China's northwest corner bordering on Tibet and Mongolia.

Then service was started by Gen. C. L. Chenault of Flying Tiger fame and head of China's Civil Air Transport, the country's largest airline. The airline reports that traffic is increasing heavily and that customer acceptance is now beyond its expectations.

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Classified Advertising

The rates for advertising in this section are as follows: "Help Wanted," "Positions Wanted," "Aircraft Wanted or For Sale," and all other classifications $1.00 a line, minimum charge $4.00. Estimate bold face heads 30 letters and spaces per line; light body face 40 per line; box numbers add two lines. Terms, cash with order. Forms close 20 days preceding publication date. Rates for display advertisements upon request. Address all correspondence to Classified Advertising Department, AMERICAN AVIATION PUBLICATIONS, 1025 Vermont Avenue, NW., Washington 5, D. C.

HELP WANTED

NEED A PILOT? NEED A JOB?

Are you qualified to fly the Atlantic, to instruct, to fly charter, to dust, or to help organize a new airline? We can help you find the job you need, or the man you need. No registration fee. PILOTS EMPLOYMENT AGENCY, Box 152, AA-8, Whippany, N. J.

FLIGHT ENGINEERS
COMMERCIAL AIRLINE OPERATION

Must meet one of following requirements. Four years maintenance experience and A&E license.

or

One year maintenance experience and engineering degree.

Minimum age 21.

Reply giving complete details on experience and training.

Box 669 AMERICAN AVIATION
1025 Vermont Avenue, N. W. Washington 5, D. C.

EXTRA MONEY—Airline employees are making substantial sums in their spare time as subscription representatives for AMERICAN AVIATION. A few good territories still available on exclusive basis. Write for details. Circulation Manager, AMERICAN AVIATION, 1025 Vermont Avenue, N. W., Washington 5, D. C.

FOR SALE

New Radio Equipment: Bendix MN31 ADFs, $750.00. Bendix MN62 ADF, $1,500.00. Bendix RA-1B receivers $650.00. BG spark plugs, RB19R-2, $2.50 each in lots of 500. Two Pratt & Whitney R985-14Bs, 878 hours since new on each and no time since overhaul by Canadian Pratt & Whitney, boxed and ready to ship, $1490.00 each. Air Transport Service, Montreal Airport, Dorval, Quebec, Canada.

AT-6 PARTS FOR SALE

Engines, props, wings, ailerons, landing-gears, control-surfaces, condition excellent. Aero Sales Company, Mineola, New York. Phone: Garden City 7-10430.

AIRCRAFT MATERIAL WANTED

R2000 & R2800 P&W engine parts & accessories; Douglas C47, C54 & A26 airframe parts; Curtiss C46, Beech AT11 & NAA AT6 & P51 parts; Generators, starters, instruments, landing gears assys., AN fittings & hardware, electrical items, valves, spark plugs, gas caps, bearings, pulleys, etc.

FOR SALE

Largest stock of aircraft parts & components on West Coast. 100% inspection, immediate delivery.

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DESIRES EXECUTIVE FLYING

When you choose a pilot for your company choose the best, an AIR LINE PILOT. There is no comparison, he has achieved his doctorate degree in the pilot's profession. He is your best insurance against all flying hazards.

I have 10,000 hours flying time, 7 years experience with one of the country's largest airlines, 33 years of age and have flown all over the world.

Box 670, American Aviation
1025 Vermont Ave., N.W., Washington 5, D. C.

FOR SALE!

DC-4 (C-54-B-DC) 50-PASSENGER AIRPLANES

$125,000.00 and up

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- Recently removed from scheduled passenger service.
- Standard airline interior.

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Att: Director of Surplus Sales

43-02 Ditmars Boulevard, Astoria, Long Island, N. Y.
(Telephone RAvenswood 8-1000)

U. S. International Airline Revenues & Expenses for May

Airlines	Total Operating Revenues	Passenger Revenues	U. S. Mail Revenues	Foreign Mail Revenues	Express Revenues	Freight Revenues	Excess Baggage Revenues	Non-Scheduled Transport Rev.	Total Operating Expenses	Aircraft Operating Expenses	Ground & Indirect Expenses	Net Operating Income
American	$ 322,193	$ 274,180	$ 8,207	$ 7,353	$	$ 18,511	$ 3,581	$	$ 298,146	$ 155,402	$ 142,744	$ 24,048
Amer. O'Seas	2,296,219	1,399,543	381,508	111,789	362,794	....	20,764	12,367	2,038,924	979,360	1,059,564	257,295
Braniff	355,519	204,449	138,613	1,523	....	5,272	5,736	....	328,687	155,120	173,567	26,831
C & S	302,468	162,326	126,046	527	....	8,605	4,916	....	264,348	117,601	146,747	38,120
Colonial	119,654	80,913	34,688	2,142	....	1,648	263	....	128,309	56,284	72,025	-8,655
Eastern	70,531	55,781	2,995	....	....	11,017	739	....	80,038	40,736	39,302	-9,506
National	92,923	71,943	8,115	....	9,823	....	1,949	1,092	131,869	58,218	73,651	-38,946
Northwest	1,195,611	518,818	484,250	54,750	3,446	120,395	9,360	....	947,520	407,694	539,816	248,092
Panagra	1,399,001	886,742	259,730	60,793	95,747	....	37,811	6,737	1,317,040	588,633	728,407	81,961
Pan American												
Latin Amer.	5,730,894	3,358,173	1,359,153*	162,555	608,787	....	106,082	67,515	5,364,878	2,268,869	3,096,009	366,017
Atlantic	4,587,441	2,301,507	1,658,753*	231,379	311,456	....	56,433	-463	4,252,081	2,185,797	2,066,284	335,360
Pacific	2,882,046	1,667,535	870,868*	67,893	235,396	....	28,572	510	2,651,656	1,391,466	1,260,190	230,390
Alaska	438,085	218,281	112,540**	....	83,191	....	1,168	22,885	411,836	210,756	201,080	26,249
TWA	3,887,688	2,517,912	776,294	224,084	238,139	....	72,957	2,976	3,298,378	1,577,930	1,720,448	569,310
United	411,545	333,979	51,787	....	8,212	....	5,561	....	349,577	205,693	143,884	61,968
TOTALS	24,091,818	14,052,082	6,273,547	924,788	1,956,991	165,448	355,892	113,619	21,863,277	10,399,559	11,463,718	2,208,538

* Represents company's estimate of amount which should be received in accordance with the terms of the Civil Aeronautics Act when permanent rates are established. Estimate exceeds temporary rates in effect by:
Latin American Div. $971,653; Atlantic Div. $1,082,968; Pacific Div. $71,532

** Temporary rate in effect exceeds estimate of amount which should be received in accordance with terms of Civil Aeronautics Act by $20,966.

NOTE: Data in above tabulations were compiled by American Aviation Publications from monthly reports filed by the airlines with the Civil Aeronautics Board. Figures for American Airlines include that carrier's service to Mexico but not to Canada; for Braniff to South America; C & S to Havana; Colonial to Bermuda; Eastern to Puerto Rico; National to Havana; Northwest to Orient, and United to Honolulu. Operations of U.S. carriers into Canada are included in domestic reports to CAB, in accordance with CAB filing procedures.

U. S. Feeder Airline Revenues & Expenses for May

Airlines	Total Operating Revenues	Passenger Revenues	Mail Revenues	Express Revenues	Freight Revenues	Excess Baggage Revenues	Non-Scheduled Transport Rev.	Total Operating Expenses	Aircraft Operating Expenses	Ground & Indirect Expenses	Net Operating Income
All American	$ 181,527	$ 43,395	$ 136,975	$ 1,767	$	$ 143	$ 280	$ 258,984	$ 123,063	$ 135,921	$ -77,456
Challenger	132,207	38,627	90,061	553	1,659	203	999	121,095	66,491	54,604	11,112
Empire	87,250	26,997	59,523	221	....	142	...	72,843	38,510	34,333	14,406
Monarch	136,910	35,265	97,867	732	2,113	273	...	134,375	69,404	64,971	2,535
Piedmont	220,630	100,792	115,293	1,006	1,628	902	590	198,306	118,154	80,152	22,324
Pioneer	293,604	135,890	150,171	947	1,526	896	694	258,134	132,939	125,195	35,469
Robinson	128,850	40,006	87,453	....	618	111	...	95,822	50,655	45,167	33,028
Southwest	215,847	99,458	106,539	1,070	4,277	312	1,339	190,061	102,226	87,835	25,785
Trans-Texas	168,854	44,327	122,217	1,225	661	389	...	218,283	122,871	95,412	-49,428
West Coast	113,401	50,842	61,319	526	....	156	218	115,686	57,966	57,720	-2,285
Wis. Central	104,389	25,086	77,878	623	....	141	...	103,135	55,956	47,179	1,254
TOTALS	1,783,469	640,685	1,105,296	8,670	12,482	3,668	4,120	1,766,724	938,235	828,489	16,744
Helicopter Mail Service											
Los Angeles	34,738	....	34,738	....	....	...	...	34,730	21,724	13,006	9

NOTE: These figures are taken from monthly reports filed by the airlines with CAB. The data are tentative and subject to later change.

U. S. Feeder Airline Traffic for June

Airlines	Revenue Passengers	Revenue Passenger Miles	Available Seat Miles	Passenger Load Factor	Mail Ton Miles	Express Ton Miles	Freight Ton Miles	Total Ton Miles Rev. Traffic	Available Ton Miles Flown	% Available Ton Miles Used	Revenue Plane Miles	Scheduled Miles	% Scheduled Miles Completed
All American	8,149	1,027,000	5,116,000	20.07	2,962	4,720	....	108,224	490,393	22.07	246,127	259,518	94.78
Challenger	2,982	856,000	2,862,000	29.91	1,941	1,794	5,111	95,041	306,210	31.03	143,089	148,590	96.29
Empire	3,362	742,000	1,921,000	38.63	1,747	1,425	....	74,088	145,919	50.77	91,029	90,600	99.97
Monarch	3,079	766,000	3,129,000	24.48	2,227	1,714	9,753	90,633	238,556	37.99	151,686	153,120	97.31
Piedmont	8,421	1,817,000	5,638,000	32.10	2,715	3,833	7,574	187,060	588,846	31.77	268,480	268,500	99.65
Pioneer	9,367	2,598,000	7,837,000	33.15	6,204	2,499	5,750	275,716	829,993	33.22	326,491	328,139	99.40
Robinson	4,014	576,000	1,376,000	41.86	1,569	....	1,271	51,928	141,154	36.79	71,532	77,564	91.60
Southwest	11,892	2,198,000	4,274,000	51.43	3,847	2,987	6,412	233,658	427,581	54.65	203,513	202,958	99.33
Trans-Texas	4,510	1,087,000	5,260,000	20.66	4,774	1,507	1,109	116,634	436,348	26.73	250,487	250,548	99.98
West Coast	7,336	988,000	2,382,000	41.47	863	1,500	....	90,382	235,263	38.42	113,413	114,980	98.36
Wis. Central	3,209	507,000	1,084,000	46.77	1,472	1,981	....	50,023	129,591	38.60	128,179	133,320	96.14
TOTALS	66,321	13,162,000	40,879,000	32.19	30,321	23,960	36,980	1,373,387	3,969,854	34.58	1,994,026	2,027,357	97.97
Helicopter Mail Service													
Los Angeles	....	....	....	...	3,745	....	....	3,745	11,390	32.88	29,818	29,984	99.45

WINGS OF YESTERDAY

25 Years Ago

The Army Air Service was asking for bids for the building of nine transport airplanes to be powered with Liberty motors, capable of carrying six passengers and a crew of two, 850 lbs. of fuel and 324 lbs. of cargo. Ground speed was to be 100 mph and the rate of climb 600 ft. per minute, with a service ceiling of 10,000 ft.

•

The Remington-Burnelli air freight carrier began a series of test flights on Aug. 7, 1924 at Curtiss Field, L. I. The plane had a fuel and cargo capacity of 8,050 lbs.

•

President Coolidge appointed Maj. John F. Curry a member of the NACA to succeed Maj. Lawrence W. McIntosh of the Army Air Service.

10 Years Ago

(In AMERICAN AVIATION)

Largest peacetime orders for airplanes and engines in history of the aviation industry were revealed when War Dept. announced awards totaling $85,978,000, with largest plane contract of $15,815,000 going to The Glenn L. Martin Co. for twin-engine bombers.

•

CAA received $4,000,000 from Congress for its pilot training program. Funds were sufficient for training 11,000 pilots.

•

L. Welch Pogue was appointed general counsel of the CAA following resignation of Charles S. Guthrie who became special assistant to the Secretary of Commerce.

LETTERS

Beaver Payload

To the Editor:

Thank you very much for your excellent article on the new de Havilland Beaver which The Babb Company is selling in the United States. We found that the material you published is quite accurate with only one exception. You stated that the airplane has a payload of only 200 pounds over a 500 mile range, whereas the ship actually has better than a 1200 pound payload over the 500 miles.

W. H. OSWALD, JR.
The Babb Company
New York, N. Y.

(Editor's Note: The error was a typo, such as plague all publications occasionally. We are happy to restore 1,000 pounds of payload to the Beaver.)

Southwest's Ground Service

To the Editor:

We at Southwest Airmotive have found that, in executive flying, as in highway driving and most everything else, it's the proverbial "little things that count." We read the article entitled "Executive Aircraft Customer Needs Better Ground Service" in your June 1 issue and are both happy and proud to report that Southwest Airmotive and Love Field appear to "check out" on all points listed by your writer.

Taking them one-by-one:

Traffic Control: The personnel of Love Field's CAA control tower has consistently proved itself interested in and helpful to the executive pilot. Tower employees pride themselves in knowing executive plane crews and being aware of their problems. They frequently visit fixed base operations on the field, and, recently, a group of them took a flight in a D18S to acquaint themselves with omni-directional receiver operation from the pilot's end of the deal.

Loading Area: Executive aircraft are cordially invited to use the airport terminal facilities by the airport manager, the length of stay being limited, however, during those periods of the day when airline traffic is heaviest. This is a safeguard for the executive pilot who, most assuredly, doesn't want to be behind the four-way prop blast of a DC-6. An overnight parking area for private planes is designated near the terminal building.

Porter Service: Southwest Airmotive has uniformed, trained personnel to meet all incoming executive planes. Baggage is carried to the hangar in a special cart built for that purpose. Free "tidying up" is accomplished on each transient aircraft.

Ground Transportation: Southwest Airmotive, as a free service, operates a courtesy car to transport visitors to any destination on the airport, including connections with both cabs and buses. Through a special arrangement with the local cab company, SAC has "Priority 1" on cabs which will come to the hangar doors promptly on call.

Clean Washrooms: Southwest Airmotive washrooms are located conveniently adjacent to the lobby used by visitors. They are cleaned twice daily and are "policed" in the interim by company officials.

Parking Areas: Southwest Airmotive has a 25-acre concrete parking ramp, second to none in the country.

Tie-Down Facilities: Outside tie-down is always available. Tie-downs are checked frequently in windy or otherwise-inclement weather as a protection against storm damage. Inside storage is available when space is opened up by the absence of locally-owned craft normally stored in SAC hangars.

Fueling Service: Southwest Airmotive operates a fleet of seven gasoline trucks and an oil truck. Service is prompt and skilled.

Maintenance: Southwest Airmotive operates one of the industry's largest and best-known "One Stop" maintenance plants, the facilities of which are readily available to the transient.

Fair Prices: Southwest Airmotive's prices are strictly competitive in nature and many of them represent flat labor rates. SAC has taken the lead nationally in publishing Flat Rate Catalogs mailed without charge to thousands of owners in all parts of the country. It is augmenting these listings with new flat rates as quickly as such rates can be sensibly determined.

Because the above "facts ARE facts," our company and our airport enjoys the patronage of executive flyers from each of the 48 states, from Alaska, Canada, Mexico, Central and South America. We have, for 17 years, specialized in meeting the needs of executive airmen and we welcome their visits and earnestly solicit their comments and criticism.

AL HARTING
Director of Public Relations, Southwest Airmotive Co.
Dallas, Texas

Wright Brother's Papers: Rare documents from the library of Orville Wright have been presented to the Library of Congress by executors of the estate. Included are records of the early careers of the Wright brothers, diaries and notebooks, description by Orville of the Kitty Hawk flight, and correspondence pertaining to the sale of the first military airplane to the War Department.

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Engineering, Economic & Advisory Services in Aircraft, Airline and Associated Activities. Financial, Management and Industrial Surveys.
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Economic Analysis and Planning for Airlines and Airports
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PARTS—TOOLS
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Listings in this section are available to qualified organizations.
For further information and rates, please write to:
AMERICAN AVIATION
1025 VERMONT AVE., N.W.
WASHINGTON 5, D. C.

BOOKS

THE ARMY AIR FORCES IN WORLD WAR II—VOL. II, TORCH TO POINTBLANK, edited by Wesley Frank Craven and James Lea Cate. Published by The University of Chicago Press, Chicago 37, Ill. 862 pages, illustrated. Price $6.

This is the second of a seven-volume detailed history of the air war. Volume II deals with the early phases of the air war against the European Axis: in North Africa, Sicily, Italy and over Germany and the occupied countries, covering the period from August 1942 to December 1943.

The Book is written in five parts: I. The North African Campaigns; II. Origins of the Combined Bomber Offensive; III. Sicily and Southern Italy; IV. Toward Overlord (the code name for air operations in the invasion of Western Europe); and, V. Final Reorganization.

For the student of history or for one who just wants a good look at the air war in retrospect, the book is well worth while. A large part of the text is written in a dull, tedious style which makes the going pretty heavy at times; some of the detailed descriptions of air operations, however, are done in a lively, fiction-like fashion which makes easy reading. The wealth of detailed information makes the "wading" worth the effort.

The next volume of the series will be "Europe—Argument to VE-Day," covering the period from Jan., 1944, to May, 1945.

AIRLINE TRAFFIC PROCEDURES by Gene Kropf. Published by McGraw-Hill Book Co, Inc., 330 West 42nd St., New York 18, N. Y. 406 pages. Illustrated. Price $5.50.

The author, who is assistant professor and director of the department of air transportation at Parks College of Aeronautical Technology of St. Louis University has prepared the material in this book to fill a need for a textbook in the airline traffic field. It is intended for use in schools and colleges and by airlines desiring material for training purposes. The book contains parts on airline reservations, passenger-handling and airline ticketing procedures, plus a part on advertising and public relations. There is a 22-page section containing a pictorial history of airline flight equipment, and an appendix listing airline city codes, flight equipment specifications and other information.

AIRCRAFT POWERPLANT HANDBOOK, CAA Technical Manual 107, prepared by the CAA's Office of Aviation Safety—powerplant engineering division. Published by the U. S. Government Printing Office, Washington 25, D. C. 359 pages, illustrated. Price $1.25.

This new volume supersedes CAA's Bulletin 28, the *Pilots' Powerplant Manual*, which was originally published in 1940 and since that time has become the standard reference work for pilots and mechanics. The revised edition brings the text of Schnedenhelm's original volume up to date.

Although minor changes have been made throughout the book to reflect advances in the individual sciences, the greatest addition is in the field of new powerplant types. There is a chapter devoted to turbo-jet, turbo-prop and compound engines. Other additions include the chapter on vibration and a section on symbols and formulas, charts and definitions.

ELEMENTS OF AERODYNAMICS OF SUPERSONIC FLOWS, by Antonio Ferri. Published by The MacMillan Co., 60 Fifth Ave., New York, N. Y. 434 pages, illustrated, with extensive graphs and equations. Price $10.

The author of this book has been able to bring together a wealth of theoretical and practical knowledge on aerodynamics and supersonic flows. As chief of the gas dynamics section at Langley Field and previously as head of the aerodynamics department, he has obtained valuable information in this important field.

Ferri divides his work into chapters of general considerations: theory of two-dimensional flow—potential flow and small disturbances; theory of shock waves; theory of two dimensional flow—interaction and reflection of shock waves and expansion waves; supersonic profiles; diffusors; three dimensional phenomena for body revolution; pressure drag of supersonic wings; lift and induced drag of supersonic wings; etc.

The book should add to the knowledge of all those working in the fields of research and application and also prove of value as a student text in advanced aerodynamics.

FLIGHT INSTRUCTOR by Charles A. Zweng. Published by the Pan American Navigation Service, 12021 Ventura Blvd., North Hollywood, Calif. 335 pps., illustrated. $3.00

This is a revised edition of Zweng's training manual for flight instructors written with the objective of preparing instructors for CAA examinations. The book carries chapters on theory of flight, technique of basic flying, elementary maneuvers, intermediate and accuracy maneuvers, advanced and acrobatic maneuvers, cross country flying, CAR, etc.

Also included are sample multiple choice type questions and answers to help prepare the reader for his examination. This is one of the more interesting books in the Zweng series with a relatively large amount of original writing arranged in a readable style.

GAS TURBINES FOR AIRCRAFT by F. W. Godsey, Jr. and Lloyd A. Young. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 344 pps., illustrated. Price $4.50.

This book gives a good cross sectional view of the gas turbine situation with a favorable balance of theory and application data. The first three chapters are devoted to backgrounds material useful in applying the specific data on turbines in the following chapters. Covered in this portion are data on the atmosphere, lift and drag, structures and components, fundamentals of aircraft propulsion, propellers, etc.

From there the book branches off into gas flows with related data on heat transfer, shock waves, etc.; compressor types and performance, fuels and burners, jet nozzles, gas turbine cycles, variations of the basic turbine cycle and accessories and controls used in starting, lubricating, supplying fuel, changing power, etc. The final chapter provides an interesting round up of the present day status of gas turbine development for aircraft use.

AUSTRALIAN AVIATION ANNUAL, 1949, edited by Stanley Brogden., P. O. Box 34, Hawthorn E2, Victoria, Australia. No price listed.

This Annual replaces the Australian Aviation Yearbook and reviews aviation news events in the Commonwealth in 1948. It contains statistics of airline operations 1947-48, and sections devoted to each of the domestic and international airlines serving Australia, to non-scheduled operators to aviation fuel suppliers and manufacturers of aircraft and aircraft equipment, and to aviation organizations and government departments concerned with aviation.

School Training Link: "Evaluation of the School Link as an Aid in Primary Flight Instruction," by A. C. Williams, Jr., Research Assistant Prof. Psych., and Ralph E. Flexman, Flight Instructor, has been published by University of Illinois.

The authors conducted experiments with several groups of flight students picked at random. Some were trained with no Link experience, some trained with a little, and others with more. Careful checks are made of this progress all during training, and the results are put into the form of graphs, some of which are shown in the booklet.

Copies are available free from the Institute of Aviation, University of Illinois, Urbana, Ill.

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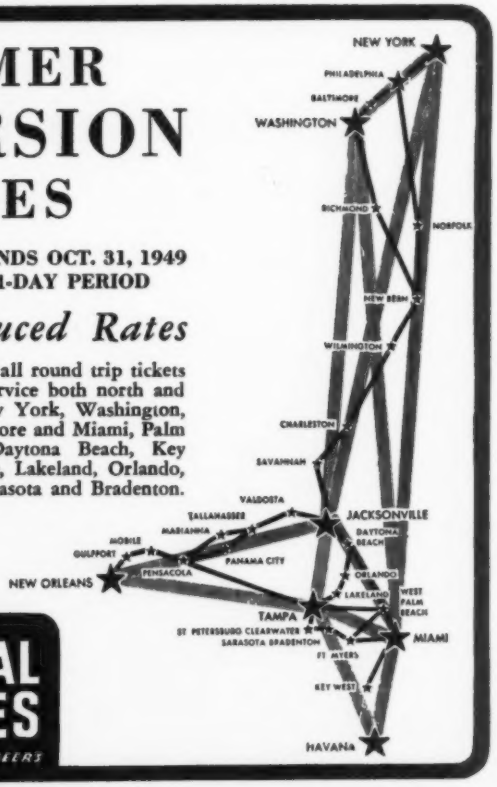

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